obtained the sanction of the Committee.

those books intended for circulation.

ARTICLE VI.—The Secretary shall have authority to loan to Members and to holders of second class stock, any work belonging to the SECOND CLASS, subject to the following regulations:

*Section 1.*—No individual shall be permitted to have more than *two books* out at one time, without a written permission, signed by at least two members of the Library Committe; nor shall a book be kept out more than TWO WEEKS; but if no one has applied for it, the former borrower may renew the loan. Should any person have applied for it, the latter shall have the preference.

*Section 2.*—A FINE OF TEN CENTS PER WEEK shall be exacted for the detention of a book beyond the limited time; and if a book be not returned within three months it shall be deemed lost, and the borrower shall, in addition to his fines, forfeit its value.

*Section 3.*—Should any book be returned injured, the borrower shall pay for the injury, or replace the book, as the Library Committee may direct; and if one or more books, belonging to a set or sets, be lost, the borrower shall replace them or make full restitution.

ARTICLE VII.—Any person removing from the Hall, without permission from the proper authorities, any book, newspaper or other property in charge of the Library Committee, shall be reported to the Committee, who may inflict any fine not exceeding twenty-five dollars.

ARTICLE VIII.—No member or holder of second class stock, whose annual contribution for the current year shall be unpaid or who is in arrears for fines, shall be entitled to the privileges of the Library or Reading Room.

ARTICLE IX.—If any member or holder of second class stock, shall refuse or neglect to comply with the foregoing rules, it shall be the duty of the Secretary to report him to the Committee on the Library.

ARTICLE X.—Any Member or holder of second class stock, detected in mutilating the newspapers, pamphlets or books belonging to the Institute shall be deprived of his right of membership, and the name of the offender shall be made public.

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EACH NUMBER CONTAINS VARIOUS ORIGINAL DESIGNS

# THE JOURNAL OF FABRICS AND TEXTILE INDUSTRIES.

FOR SPINNERS, MANUFACTURERS, BLEACHERS, DYERS, PRINTERS AND FINISHERS,

EDITED BY
H. & R. T. LORD,
10, ANN PLACE,
LITTLE HORTON LANE,
BRADFORD,
YORKSHIRE.

OF COTTON, SILK, WORSTED, WOOLLEN, JUTE, AND ALL CLASSES OF TEXTILE FIBRES.

THIN FOREIGN EDITION.

# The Journal of Fabrics AND Textile Industries.

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## Contents.



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## Woollens and Worsteds, etc.

In making designs, patterns, and cloths for worsted coatings, trouserings, suitings, etc, also for woollens, and other cloths which are made to fit close to the wearer, the chief objects must be that they shall be firm in handle, sufficiently pliable not to feel hard and file-like, and also bright and attractive looking. Cloths for gentlemen's wear require these conditions to be carried out much more perfectly than the light fabrics used for ladies dresses, inasmuch as the cloths for the latter purpose are generally made so as to drape in folds, while those for gentlemen have to bear the strain of physical exertion in all its aspects. Having a desired pattern to make, it is often necessary to try it in several different cloths before one can be found which will suit it perfectly. Some cloths, in which the pattern looks well, are too heavy, some too light, whilst in others that are the proper weight the pattern is either too loose, or too fast, giving the file-like appearance spoken of. We shall endeavour to give a few of the most important patterns in use at the present time, and also the build of cloth which will yield suitable results, though, of course, the weight of the materials may be different from what the reader may at present require, but as there has been so much said in our Textile Journals lately, re "cloth building" and "cloth structure," and so much correspondence has been entered upon, and as the subject has been so heartily taken up in our various schools, the readers of this Journal will have little difficulty in adopting any one of them to his own immediate use. We shall not give the well known 13 end corkscrew, because it is, we think, nearly played out, though it is still a good and serviceable pattern, but its great fault lies in its feeling hard and papery if much material is put in, whilst it has also a tendency to shine or wear brilliant where friction has been applied—principally down the front of the coat, where it is buttoned, and also under the sleeves where the arms rest upon the table or the desk. One of the first considerations in designing for materials of this kind is to have a pattern and cloth which will be strong enough to bear the strain to which it will be subjected, and also sufficiently pliable not to wear brilliant or "shiny." Fig. 1 is a simple twill upon 10 ends, arranged in ordinary satin, with the warp floating on the face for 8 picks, then going to the back for two picks: this arrangement gives what some people call a "corkscrew," while others designate it a "rolling twill." It is a very fine rib, running at an angle of about 60 degrees across the cloth. The fineness of the rib might be varied very considerably by altering the size of the warp, and the angle at which the twill runs will depend upon the thickness of the weft and the quantity of picks. A very good cloth can be made as follows:—100 ends per inch of 2/36's worsted, and 88 picks per inch of 16's worsted weft. This would give about 20 ozs. per yard, finished 56 inches by 36 inches, and woven about 64 inches in the reed. Fig. 2 is another similar pattern, but upon 11 ends. In this the warp floats on the face for 7 picks, then goes to the back for 1 pick, and again floats on the face for 2 and on the back for 1. By this arrangement, the ribs have a complete separation from each other, and appear very bold and conspicuous, while the large float gives the cloth a loose and open texture, and at the same time maintains a good weight. The binding of the pattern gives the back of the cloth a very peculiar appearance, something like the 13-shaft "corkscrew" back previously spoken of. Anyone interested in this branch of designing would do well to study this and similar patterns, as the order of interweaving and the particular satin order of arrangement, in some cases, give altogether unlooked for results, some of which are extremely valuable in the making of new patterns. A good cloth for fig. 2 would be 112 ends per inch of 2/36's worsted, and 80 picks per inch of 18's worsted weft, being about 20 ozs. finished. Another style of this kind is shown in fig. 3. This pattern has a backing warp put upon it to give it extra weight, and also to give the pattern more definition. If the pattern be carefully examined, we shall see that the face pattern is made by transposing, or reversing, every pair of threads, the pattern being upon 14 ends, with a long warp float. The back is a 14-end twill, being allowed to float at the back over 13 picks, and to bind on the 14th, and is complete upon 7 ends, as the threads advance in twos across the design, which allows it to be complete at the same time as the face, the face being 2 ends to the back 1. This would make a good cloth if made as follows:—140 ends per inch of 2/40's worsted, and 90 picks per inch of 2/30's worsted, giving a cloth 23 ozs. per yard finished, the face and back warp being the same. Another similar pattern is shown in fig. 4, where the twill is reversed at intervals. The pattern is shown as having 16 ends in each direction, but this might be varied at will. 16 ends in this sett would give a very small stripe, therefore, we would suggest that it be repeated twice, or three times, or the stripes might be arranged so that one is considerably larger than the other. In this pattern, a backing warp is put upon it so as to make the cloth a very heavy one. As will be readily seen, an 8-end satin on the face, and bound on the back with the same pattern, will allow a large amount of material to be put in. Fig. 5 is the draft for it, on 16 healds, 8 for face and 8 for back, fig. 6 being the pegging plan for the same. A good build of heavy cloth would be:—180 ends per inch 2/36's, and 80 picks of 2/30's, giving 28 ozs. finished. In each of the foregoing patterns, novel and pretty effects can be got by reversing the twills, and also by the introduction of colour, especially twist yarns. Another form of pattern is shown in Fig. 7, where the pattern is an ordinary satin stripe, composed of warp and weft stripes alternately. The effect of this is to throw up the stripe formed with warp, while the stripe formed with weft is equally depressed, giving a very pretty appearance; the effect is also heightened by employing

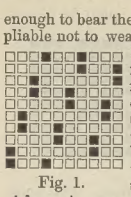

Fig. 1.

Fig. 2.

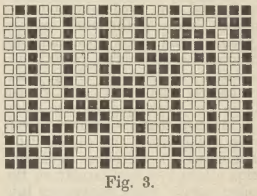

Fig. 3.



Fig. 4.

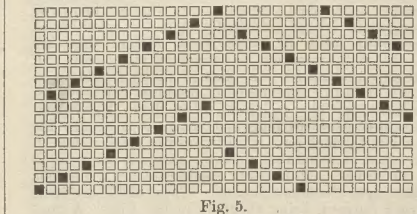

Fig. 5.

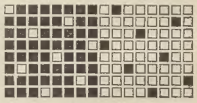

Fig. 6.

thick warp and crowding it together, while the weft might be of any

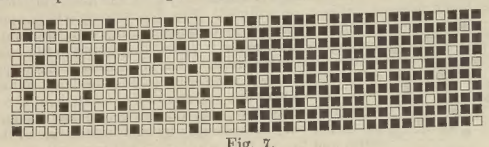

Fig. 7.

reasonable thickness without materially altering the effect. This class of pattern might be advantageously employed for the making of light serges for ladies' wear. Fig. 8 is the draft and fig. 9 the pegging plan

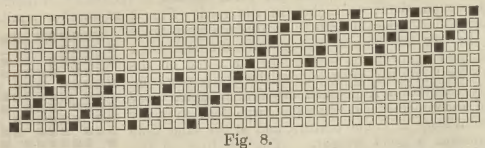

Fig. 8.

for the above, and for a 16 oz. cloth a good build would be:—70 ends per inch of 2/32's worsted, and 72 picks of 18's worsted weft. This class of pattern might be very successfully imitated by employing right and left twist yarns for the respective stripes, and running the satin all in one direction.

In the making of fancy woollen cloths, we do not trust so much to pattern as to colour. We generally find that woollens, in whatever weight of cloth, use the ordinary twill, 2 weft and 2 warp, and vary the weight by altering the thickness of the warp and weft, and by predominating one material over the other. Many of the fancy woollen hair-lines get their peculiar and smart appearance by adopting what is known as the double plain cloth, which is two plain cloths one over the other, interwoven in such a manner that each weft thread intersects each cloth in the same degree, care being taken to arrange the colours in such a manner that one colour of weft passes over only those threads of warp which are of the same colour. Another method of ornamenting woollen cloths is to introduce mohair or other bright yarns, the bright yarn being allowed to float largely on the face of the pattern, while the dull woollen yarn is being interwoven into the body of the fabric, and shows up the bright material very prominently. In all fancy woollens, twist yarns enter very largely into the composition of the fabric, being generally much thicker than the body of the cloth, and, in some cases, made up of three or four different colours twisted together. As the twist cannot be in always the same position in relation to the twill, sometimes one colour is on the face, and sometimes another, which gives it a variegated appearance. Another form is to employ what is known as knop or "snowflake" yarn, which is ordinary coloured thread with different coloured flocks twisted into it; this gives the fabric a very rich appearance, when good and harmonious colours are used, as the knops can never repeat themselves with the regularity of either stripes or twists, making an ordinary plain cloth appear as though it were a very large pattern. We shall not trouble the reader with any examples of the above as they are so simple and easy of adoption, but we should like to point out that the main thing to look to in this class is the arrangement of colour, which is the acme of all good designing. Another class of fancy woollens which are now claiming a great deal of attention are what are known as tennis cloths. These again depend principally upon the colouring of them, they are generally made in stripe form, though they are equally good in checks, if the checking be done very judiciously. Of course, as will be readily understood, this class of cloths should be so coloured that they will give the appearance of lightness and coolness, hence the use of so much light blue which we see in then. The colouring, in all cases, should be used sparingly and not so as to destroy the appearance of cool comfort, which pure white so readily gives, in fact, it should be carefully borne in mind that these cloths are to be worn in summer, while the sun shines, and that dark sombre colours would look very much out of place upon the tennis ground. These cloths are made 8 to 10 ozs. per yard finished, being about 32 inches wide. A good heavy cloth might be made as follows:—60 ends per inch, 24 skeins woollen warp, and 56 picks per inch, 25 skeins woollen weft, giving a cloth about 9½ ozs. per yard. Another good cloth would be 70 ends per inch of 40 skeins warp, and 72 picks of 36 skeins weft, giving 8 ozs. per yard. This would be very much finer and lighter than the first. For colourings we should recommend the following—White and light indigo, white and dark indigo, white and pale pink, white and light blue and pale pink in the same combinations, pale brown and medium brown, each combined with white, etc. In all the combinations, let the white predominate very largely. In checking patterns of this kind, use less colour for the stripe, otherwise there would be too much massing in them, which would spoil the purity of the combination. These are generally woven with an ordinary twill—2 weft and 2 weft, but they might with effect be arranged in stripes after the manner of the herring bone. If this be done well, the slight raising that the cloth undergoes will tone down the effect, while the colouring will be shown with greater advantage, care being taken that it is not too prominent. This method will allow of a stronger colour being used if it is placed in the centre of the stripe, as the break in the pattern will prevent any violent contrast due to the juxtaposition of two strong colours.

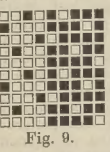

Fig. 9.

## Dyeing and Staining.

*Some Remarks on the Theory of Dyeing.* E. Schunck, Journ. Soc. Chem. Ind., Dec. 31, 1888.

(*Continued from Page* 63.)

It is certain that Crum's labours, whether we agree with his conclusions or not, form a valuable contribution to the theory of dyeing. On examining Crum's figures of dyed cotton fibres carefully, it will be found that some of the features do not correspond very exactly with his theory. In the first place, the colour does not in all cases lie solely in the cavity of the fibre, but is, to a great extent, uniformly diffussed through its entire substance. Secondly, in those cases in which the coloured particles are found in the cavity only, they do not form a uniform layer on the side of the cell, as would have been expected, but are seen in the shape of granular masses or clots, just as if some coagulation or precipitation of the mordant had taken place previous to dyeing. When a solution of aluminium acetate is evaporated upon a glass plate, a residue is left in the form of a transparent gum-like pellicle adhering to the glass. We should expect the same thing to take place when a solution of the salt contained in the fibre of cotton is evaporated; the residue left after dyeing would adhere to the sides of the cavity, and the dyed fibre would show a uniform distribution of colour throughout its interior. Thirdly, unbleached cotton, according to Crum, takes up more colour than the same cotton bleached, a fact which cannot easily be explained in accordance with his theory. Fourthly, unripe cotton fibre—so-called dead cotton—though it cannot be dyed in madder colours, does take up the colouring matter of safflower, and there being, in this case, no cavity, it must be the substance of the fibre itself which is dyed. It would appear that, in the dyeing of cotton, the foreign substances accompanying the cellulose, which are to some extent removed during the process of bleaching, play some part. Of these substances, the author described several, more than twenty years ago. They consisted of fatty matters of several kinds—colouring matters, pectic acid, and small quantities of an albuminous substance. It is quite possible that some of these substances may—as well as the cellulose—take up colouring during the process of dyeing. Let us suppose—not at all an extravagant assumption—that cotton fibre contains within its cavities some kind of calcareous soap; this, when it comes into contact with albuminous or iron mordants, would at once form soaps containing alumina or ferric oxide; and these compounds would, in dyeing with madder, take up colouring matter (as similar compounds prepared artificially do in Turkey-red dyeing), the dyed fibre presenting then an appearance under the microscope perhaps such as is seen in some of Crum's figures. The albuminous substance might also play some part in cotton dyeing, especially in cases where substantive colouring matters are employed. Should this subject—namely, the manner in which cotton fibre unites with colouring matter—be taken up again, the author suggests that the cotton be subjected to the action of various solvents before commencing the dyeing experiments. Of these solvents many may now be obtained in commerce which were formerly only seen in laboratories. Let a quantity of raw unspun cotton of good quality be taken and treated—first with carbon disulphide or petroleum ether, then with alcohol or ether, then with boiling water, then with hydrochloric acid, lastly with caustic alkali. After the use of each solvent, let the dyeing experiment be made, and let the dyed fibre be carefully examined under the microscope, the substance or substances removed by each solvent being also examined. It would then be seen whether any of these foreign substances play a part, and, if so, what part, in the dyeing process. As a final experiment, the residual cellulose might be dissolved in Schweizer's liquid, re-precipitated, and then heated in various ways in order to see whether it would receive dyes in the same way as cotton fibre itself. The interesting discovery by Witz—who has converted cellulose, by the action of bleaching powder, into a body which he calls oxy-cellulose, and which behaves to colouring matters in a different manner to cellulose—shows that it is advisable to conduct such experiments as these with unbleached and untreated material. Experiments of this kind may appear trivial and unimportant to the mere Philistine, but intelligent technologists are aware that important results often flow from investigations having no immediate practical aim. There is a portion of this suject, to which, in conclusion, a few words may be devoted—I mean the permanence shown by our dyes when exposed to light, air, and other destructive agencies. In this respect, as we all know, modern dyes are far inferior to those of former times. Chevreul made a vast number of experiments on the stability of the dyes produced in his day on exposure to the action of light, heat, air, and steam, the results being given in his "Recherches Chimiques sur la Teinture." Chevreul discovered minute differences as regards the stability of the same dye according to the material employed, whether of wool, silk, or cotton. Still greater differences were observed when

different mordants were employed in combination with the same colouring matter; but much greater differences, as might be expected, when, *cæteris paribus*, distinct colouring matters were made use of, although, in the latter case, Chevreul found it impossible to uphold the distinction formerly so much insisted on between dyes called "grand teint" and those called "petit teint." If the same careful method of experimenting were employed in the examination of modern dyes, the results would doubtless be interesting. Modern tinctorial chemistry has succeeded in preparing, for employment in the arts, a number of very useful colouring matters. The dyes obtained by their use are mostly very brilliant—unfortunately, they are also extremely fugitive. This is in some respects a disadvantage, It is of little consequence, as Chevreul observes, whether the colour of ladies' dresses is permanent or not, since here it is only brilliancy and lustre that are sought; but with hangings of rooms, which should last some time, the case is different. Let the room be decorated and furnished, as regards design and colouring, so as to satisfy the requirements of taste, then how great the disappointment and vexation when we find the colour of the window-curtains, where exposed to the sun, fading away, not uniformly but in streaks, so as to entirely destroy the harmony of colouring which at first prevailed. Accidents such as this, which now frequently occur, make us sigh for the good old-fashioned dyes of former days. Then, again, if the taste in design and the colouring of the present day is of a character to render the fabrics to which it is applied worthy of preservation as specimens of our workmanship, something will have to be done to render our colours more permanent, for it is pretty certain that many of the fabrics of to-day will, in course of time, appear nearly colourless. Much, I am convinced, could be done by our tinctorial chemists in producing dyes of more stable character, if it were worth their while to do so. Some time ago, I exhibited some specimens of a very permanent dye obtained from chlorophyll, one of the most fugitive colouring matters. The permanence, in this case, was due to the use of cupric oxide; any other base, such as zinc oxide, would have yielded a fugitive dye. This is referred to, not as being a matter of any practical importance but, as showing what may be done by using an appropriate mordant. With regard to water-colour drawings, as to the permanence of which much discussion has of late taken place, the author thinks it would be wise for artists to use only such pigments as are prepared from mineral substances. If, as it seems to be the case, even indigo-blue dissappears in time from the surface of water colour drawings, there can be little hope of any other colouring matter of organic origin resisting the action of light and air on lengthened exposure.—*The Journal of the Society of Dyers and Colourists.*

## Manchester Chamber of Commerce.

### DAMP IN COTTON: ADDRESS BY MR. WATSON SMITH.

At a special meeting of members of the Manchester Chamber of Commerce, Mr. Watson Smith, lecturer in chemical technology in the Owens College, read a paper on the subject of "Damp in Cotton." Mr. Watson Smith began his paper with an illusion to some correspondence which appeared in the newspapers at the commencement of January last. A buyer of raw cotton wrote a letter, headed "Damp Cotton," commencing with the plaint that "the stocktakings of various spinning mills were confirming previously communicated remarks of his to the effect that the American cotton this season was exceedingly damp." The letter terminated with an expression of opinion that it was quite time that the damp question was grappled with. In a communication following this, he (Mr. Watson Smith) pointed to the fact that conditioning establishments are provided on the Continent for the determination of the amount of water in wool, silk, or even cotton, for the legal assessment of depreciation, and that an analogous course ought to be adopted in this country; also that, if a unanimous determination on the part of the Chamber of Commerce supported them, such establishments might be arranged. On the 13th of January he received a letter from the principal of a cotton manufacturing firm in St. Quentin (Messrs. Joly Frères, Jourdain et Cie.) The writer expressed his opinion that his (Mr. Watson Smith's) letter gave a practical solution as to the estimation of moisture in cotton, wool, and silk, and continued:—"The establishments known under the name of public conditioning establishments are only for the purpose of testing yarns, and we have not yet obtained the power to cause determinations to be made of the moisture in the crude materials as a matter of legal right. For cotton yarns, the legal amount of moisture—that is, the quantity which cotton may legally contain without any reclamation being made, is as a maximum 8 per cent., that is to say, commercial cotton may contain 8 per cent of water in excess of its weight when absolutely dry. We have ourselves made numerous tests for many years on the crude cotton arriving from India and America, and we have been able to determine that a crude cotton in good commercial condition contains from 6 to 7 per cent. of moisture, but the cottons of this year contain from 9 up to 12 per cent., which means a considerable loss. We have taken the liberty of giving you these details, thinking that they would interest you, and hope that one day the Liverpool market will submit to the conditioning tests which give to the seller as well as to the buyer the necessary guarantees." This letter was of interest and importance, as showing what the French spinners had been able to do so far. From five firms he had received a considerable number of samples of raw cotton, most of which he had tested for moisture. He had also received Mr. C. T. Bradbury's report to the Committee of the Cotton Spinners' Association on a series of experiments undertaken by him in order to see if a scientific method of determination of the moisture could not be arrived at, followed by an equally scientific method of adjustment or assessment, so as to form a basis upon which spinners would be entitled to demand allowances for all their purchases in excess of such percentage agreed to by the trade as a proper percentage. Mr. Bradbury's proposition was that a standard of moisture, and a means of ascertaining the deviation for it should be agreed upon by the Cotton Spinners' Association on the one hand, and the Liverpool Cotton Association on the other; that the buyer of any lot of cotton should have the right of challenging it as to quantity of moisture it contained, and have it tested by some competent person; that if it contained 1 per cent. of moisture more than the standard, then the seller should deduct from the invoice so much per cent. as the cotton was short of the recognised standard, and pay the cost of test. On the other hand, should the cotton be within the limit named, then the invoice should stand, and the buyer should pay the cost of test. The method of testing suggested was that a certain weight of the sample be taken and heated for one and a half hour, in a steam jacketed oven, at a temperature of 170° Fahrenheit and weighed, 8 per cent. to be added as the amount of water normally present, the difference, if any, being considered and reported as "added water." This was a standard to be appealed to with official authority, and would, in Mr. Bradbury's opinion, afford redress to spinners, and check the evil of damp cotton. Now, Mr Bradbury said nothing about the sampling of the cotton before testing, which was a matter most liable to be overlooked both by manufacturers and chemists. Many companies had been before now floated, and had speedily found themselves in the shoals, if not stranded, on the basis of a false sample, honestly tested and honestly reported upon, for even the taking of a fair and accurate sample was an art. The method he should propose would be one similar to that adopted in the case of shipments of cask or puncheon packed soda ash or bleaching powder, or even tallow. A sampling iron or similar instrument should be used, something like a huge gimlet, but without pointed screw thread, of semicircular section and sharpened point and edges. This should be driven with twisting motion into the bale, and a sample taken from something like every other bale in the cargo. The long cuttings might be covered up, taken to a room at the normal temperature, and quickly pressed into a block resembling a miniature bale, from which specimens might be taken by means of a small sampling iron. These specimens, if properly cut, would be of fair average kind. Of the textile fibres, the animal fibres (wool and silk) were the most hydroscopic, most of all wool, which, on absolutely drying, at all events just short of scorching, would, on exposure, re-absorb from 18 to 18½ per cent. of moisture, and this under normal atmospheric conditions. Cotton was the least hydroscopic, or moisture absorbing, of the three fibres mentioned, but it was quite sufficiently so to cause loss or gain in a very appreciable degree. The reason of the differences of hydroscopicity was probably to be found for the most part in the relative amount of surface, in a microscopic sense, exposed by each fibre. He should like to demonstrate, by a simple experiment, that while cotton absorbed moisture rapidly from the air and increased in weight, wool did so more rapidly. Mr. Watson Smith then placed upon the pan of a scale some perfectly dry cotton, with the object of showing that it absorbed moisture from the air of the room, in order to attain the balance of moisture. The scale pan speedily sank. The pointer of the scale, he explained, moved round more rapidly than the minute hand of a clock. Wool was subjected to a like experiment. Equal weights of cotton and wool were placed in the scales. The scale pan containing the wool sank, proving that, in spite of the fact that the cotton was absorbing moisture, the wool was absorbing it much more rapidly. Continuing, Mr. Watson Smith quoted a number of authorities on the amount of moisture present in cotton. Dr. F. H. Bowman, in his very important work on the cotton fibre, stated:—"Apart from any addition of water, with fraudulent intent, there is always a certain quantity present, which passes off when the cotton is exposed in a loose condition in a room or warehouse at about 60° Fahrenheit. This quantity of water varies with different seasons from 1 to about 4 per cent in the new crop, and rather less as the season advances. Above 2 per cent of the moisture over that essentially present, however, seems to be an excessive quantity, even in new crop cotton, and, when more than this is present, it is either the result of a wet season and the cotton has been packed before drying, or else it has been artificially added. As regarded the moisture essentially present, Dr. Bowman's experiment placed it at from 5 to 7 per cent. In a work on the sizing and mildew on cotton goods, published in 1880. by Messrs. Davis, Dreyfus, and Holland, another aspect of the moisture question was regarded—namely, that pertaining to exported goods; and they read:—"When goods are passed as well dried to the feel in Manchester (cotton piece goods, of course), and are exported to India or China markets, they will, if packed in bales, in all probability lose water by reason of the change in temperature. If, however, the parcels are enclosed in a metallic envelope from which the moisture cannot find egress, merchants must not be surprised to hear that a delivery of goods opened, say at Calcutta, was found not only to be steaming, but that, as the temperature of the day fell, drops of water appeared on the top and sides of the tin casing." He was informed by Mr. William Thomson

that, in regard to dyed cotton piece goods, a just perceptible feeling of dampness indicated the presence of close upon 10 per cent. of moisture. He could confirm this observation of Mr. Thomson after some experiments of his own, and it might be a useful hint to manufacturers and buyers. The question immediately before them was, of course, that of moisture in raw cotton. As to the amount of moisture in the specimens of raw cotton sent him by the five firms, he had to say that the insides, outsides, and cardings were teated in two large average samples. In the first, the percentage of moisture in the inside, outside, and cardings was 7.5; and, in the second, the figure was 7·5 for the inside, and 7·0 for the outside and the cardings. No complaint could be based on these tests, if the samples were fair averages, for they showed that the water present was in the proportion normal to raw cotton. The result of the test of samples from the third firm showed that the insides contained a percentage of from 7·13 to 8·41, and the outsides from 6·98 to 7·98. The fourth firm sent six samples, containing from 7·8 to 9·4 per cent. of moisture. The last firm sent a specimen which he found to contain no less that 13·63 per cent. of moisture, or about one cwt. to the ton of cotton in excess water, for which good money was paid. However, he was bound to say the last was the only samples which he could really trust as a fair one. It was sent in a tight tin case; the others were in brown paper parcels. They would, consequently, evaporate; but he gave the result of the test of these for two reasons, first, to illustrate the fact of evaporation, so as to attain the balance characteristic of cotton exposed to the open air, and, second, to show that great care must be taken in these matters, that not only should the samples be fairly taken, but securely made up for analysis. At a meeting of the Committee of the Cotton Spinners' Association, held on the 27th July, 1886, Mr. W. H. Holland pointed out that in France—in Roubaix, Rheims, and Lille—one uniform standard of dryness was in force for the principal fibres. The standard for silk was 11 per cent. at 248° Fahrenheit; wool 18¼ per cent. at from 221° to 230°; and cotton 8½ per cent. at 230°. The temperature used for the drying of cotton was authorised at 230°. He (Mr. Watson Smith) might say that some experiments of his own had shown him that the temperature for cotton was rather a risky temperature. There was a danger of scorching the cotton. He should rather prefer a lower temperature. In conclusion, it was hardly necessary to remark that earnest attention to this apparently simple question and its practical solution would not be without its final reward. It would be another risk and source of anxiety and loss disposed of, and he thought it was a matter worthy of united vigorous action.

## The System of Distribution of Earnings.

Much has been said, and not a little has been done, in this country in order that operatives may have a fair share of the money gained in various branches of trade, and many of our manufacturers have been noted for the multitudinous benevolent schemes which they have promoted and carried out for the benefit of their employées. Our readers will be able to recall the names of many such, of some who have gone to their final home, and whose names are household words, and of others who are still bearing the "burden and heat of the day," and who, we hope, will be long spared to carry out much further their good intentions. But we must not forget that Great Britain does not contain the whole army of such men. Some, amongst whom we may mention in the front rank Mr. Dolge, of Dolgeville, New York, are to be found amongst our American cousins. A short account of this philanthropist, for such he must be considered, is a German, having been born (1849) at Chemnitz in Saxony, and educated at Leipzig. At the age of fourteen years, he entered his father's business-house (A. Dolge and Co., piano manufacturers) as an apprentice, and when only seventeen, he left for New York to develop his knowledge of his trade; he remained until 1868, and then returned to Leipzig. Mr. Dolge, however, stayed at home only a short time, and then returned to the States, which he had decided upon making his home. He found employment with F. Mathushek, the piano maker, with whom he gained much valuable information. At that time, the hammer cloth so largely used in the States was very poor, and Mr. Dolge, knowing that much better could be gained in Germany, ordered a small quantity as an experiment. In two days' time, his importation was sold, and he had made a profit of several hundred dollars, which decided him to import still further quantities, and when his master commenced making upright pianos, Mr. Dolge advised him to adopt Poehlmann's wire instead of Rolleson's, which was deficient in tension, and began to import this also, and when, in 1869, there was a general reduction in wages, he determined to leave his former situation and become an importer of piano materials, which, until then, had been brought chiefly from England and France, but he foresaw that a good business could be done with the Fatherland, and, in spite of opposition from long-standing firms of good financial position, and by unwearied perseverance and strict economy, he succeeded in supplying his goods to the best piano makers of the United States, and so laid the foundation of a flourishing business. He next turned his attention to hammer felt, which he did not import, and as he had not sufficient capital, he organised a company of four persons that they might manufacture the material required, but when the time came to pay for the machinery, his partners were not ready with their share, and Mr. Dolge was left sole owner of the business, which was not a success, in a money point of view for many years, but the loss on this branch was more than covered by the gain on the importing part, and, therefore, it was possible to experiment until success was gained, and the firm became the largest felt manufactory in the world, and, as time passed on, he added polishing, rubbing and printing, and later still, shoe felt manufacturing. His factories at Dolgeville, formerly Brockett's Bridge, are amongst the finest of the United States, and the success which has attended Mr. Dolge's efforts has been owing, in no small degree, to the harmony and good feeling which have existed between master and employées. It will be interesting to our readers to know something of the system of "Distribution of Earnings," as it is carried out at Dolgeville, as remuneration, pensions, life insurance, mutual aid association, school society, club house, public parks, &c.

### REMUNERATION.

The amount of remuneration has, so far, depended upon the arbitrary decision of the proprietor, with due consideration of the results achieved in the different departments. The introduction of a positive system based upon the experience of the past years is now under consideration. It is the intention to perfect the same in such a way that a change of management or ownership of the business cannot affect it.

### PENSION.

The pension plan grew out of the mutual aid society started among the employées a few years ago. January 1, 1882, he proposed to enlarge the benefits of the society by a plan devised, controlled, and supported by himself. The following is a copy in full of the pension law:—New York, January 1, 1882. From a desire to improve the material condition and prospects of its employées, to establish them as a compact, contented, and well-regulated community, and to fasten the mutual ties of esteem as well as of interest, that hold us together, and without which no lasting success is possible, the firm of Alfred Dolge has this day made the following pension law. Every regular employée of the firm of Alfred Dolge shall, after a *continuous* service of *ten years*, be entitled to a pension under the following conditions:—Pension will be due in case of partial or total inability to work, caused by accident, sickness or old age, as long as such inability may last, and it is to consist in the following quota of the wages earned during the last year, namely:—Fifty per cent. after ten years' service; sixty per cent. after thirteen years' service; seventy per cent. after sixteen years' service; eighty per cent. after nineteen years' service. Ninety per cent. after twenty-two years' service; one hundred per cent. after twenty-five years' service. In case of accident while on duty, or of sickness contracted through the performance of duty, employées shall be entitled to a pension of fifty per cent. at any time previous to the completion of ten years' service. As the pension is to be an equivalent for lost wages, the title to it is strictly personal and not transferable under any circumstances. In cases of partial loss of wages, where earnings are not cut off entirely but only reduced, the pension is to be computed on the difference of wages only, representing the loss actually sustained. The above regulations do not in any way affect the right of the firm to discharge employées, or of the employées to leave. The firm reserves the right of amendments to the above law, and of final decision in case of doubt, and in all pertinent questions not above provided for.

### LIFE INSURANCE.

January 22, 1887, Mr. Dolge laid his life insurance scheme before his employées in the following announcement:—"After considering a variety of plans, I have finally come to the conclusion to set aside a certain portion of the business profit each and every year for the purpose of paying premiums on life insurance policies. The rule which I have established is simply this:—That each employée who has, for five consecutive years, been in the employ of the firm is entitled to a life insurance policy of 1,000 dols., and, at the expiration of the tenth year of steady employment, to another 1,000 dols. policy. Premiums and all expenses will be paid by the firm as long as the insured is in the employ of the firm. For those who have been rejected, an amount equal to the premiums will be regularly deposited in the German savings bank of New York." At this time, forty-seven employées are beneficiaries of the life insurance plan. They carry policies aggregating 107,000 dols. The premiums paid last year amounted to 4,821·99. The total outlay in this department since it was established is 10,331·71 dols. Nine persons entitled to pensions under the rules have been rejected by reason of their age or physical infirmities. For these Mr. Dolge has placed in the savings bank the sum of 533·65 dols., representing the premiums he would have had to pay on policies if the candidates had been accepted. Mr. Dolge discriminates in favour of his high-priced help where he deems it just—as, for instance, the director of his felt factory—who carries 10,000 dols. in life insurance. The apparently small number entitled to life insurance policies is due to the fact that the factories were started by Mr. Dolge in 1875 with twenty-seven employées. Only seven of these remain with him. The business has made its greatest progress within the last six years. In 1878 only forty-two persons were employed, and thirty-eight remain in his employ. Of the 140 employed in 1883, but 112 were in Mr. Dolge's service January 1, 1888. The number eligible for insurance is increasing each year, however. It jumped from thirty-six in 1887, to forty-seven last year, and will reach sixty this year. To be entitled to a place on the list of regular workmen, the employée must have been at steady work one year.

OTHER PROVISIONS.

Remunerations, pensions, and the life insurance are considered an equalisation between the wages of the workingmen and the increased profits resulting from their work. Not coming properly under the head of profit-sharing, but closely connected with the same as institutions for the benefit of the workingmen, are the Mutual Aid Association, the School Society, the Club House and the Public Parks.

THE MUTUAL AID ASSOCIATION.

Eight years ago, Mr. Dolge started the Mutual Aid Society with a gift of 400 dols., to which he added other donations at several times. He sought to make his employées independent, and to interest them in the management of an affair of their own. Each member of the Society earning 6 dols. a week, or more, pays 50 cents a month in dues; those earning less than 6 dols. a week pay 25 cents a month. In case of sickness, members of the first class receive 5 dols. a week from the relief fund, and of the second class, 2 dols. 50 cents. Sickness, the result of irregular habits or mode of living, secures no benefits; nor if the disease is simulated, or if it existed at the time the member was admitted to the Society. Members not entitled to relief regularly, but needy, because of old age or excusable sickness, may be given 1 dol. a week or more, if the committee appointed to investigate the case decide that it is worthy, and the Society's finances will warrant the drain. When a member dies his heirs receive 50 dols. The amount paid for relief from the founding of the association to December 1, 1888, was 4,708 dols. 52 cents. The number of members is 155.

THE SCHOOL SOCIETY.

A few years ago the employées organized a turners' society. Out of the evening school for physical exercise grew the school society. The employées of the Dolge factories organized the society for the purpose of giving their children increased advantages for obtaining an education. During 1886 and 1887 the members of the society spent considerably more than the regular tax levy in the support of the public schools. The men paid 10 cents each and upwards, and Mr. Dolge contributes 300 dols. a year. In 1886, Mr. Dolge donated 7,000 dols. for a new school house. The taxes for the same purpose amounted to 6,000 dols., and Mr. Dolge paid 2,000 dols. of this sum, so that 9,000 dols. out of the 17,000 dols. which the new building cost, came out of his pockets. On November 26, 1888, the School Society decided to found the Dolgeville Academy. Mr. Dolge agreed to contribute 4,000 dols. yearly toward the work of the society. Free evening schools, under its organization, have sessions five times a week. Mr. Dolge and his employées have merged their school with the public schools. They control the school system of the district, double the school taxes by their personal contributions, build school-houses and academies, and provide for a higher grade of instruction than the common school system includes. For this academy Mr. Dolge is erecting a new building at his own expense. Since 1883, Mr. Dolge has paid teachers for an evening school, which has been free to all.

THE CLUB-HOUSE AND THE PUBLIC PARKS.

Mr. Dolge built the large club-house, at a cost of 10,000 dols., containing gymnasium, stage, bowling alley, library, billiard rooms, etc., for the purpose of giving his working-men a meeting place where they could meet socially. Beer only sold—no liquor—no gambling allowed. The parks cover an area of about 140 acres, are well taken care of, provided with good paths, seats, benches, and tables at convenient places, and the natural beauty of the parks, with their waterfalls, cascades, island to which a suspension bridge leads, are much frequented by the working-men and their families.

OTHER BENEVOLENCES.

Mr. Dolge also helps his men to buy their homes. He builds houses for his employées on plans prepared by them, and allows them to pay the cost in monthly installments of 10 dols. each. The habit of saving inculcated by this plan is not its smallest benefit. Sixty of Mr. Dolge's employées own their own homes, and ten others have bought lots to build on. The village has no savings banks, and Mr. Dolge allows his workmen to leave their wages with him if they desire. He takes their wages as a sort of call loan, and pays 6 per cent. interest upon them. Only such money as is earned as wages, and is not drawn when due, comes under this arrangement. Mr. Dolge does not encourage this savings bank business, as he prefers that the men be independent in every respect. Neither does he advise his employées to purchase real estate in the village, because its prosperity depends on the success of his manufacturing enterprises, and such advice would run counter to his idea of the desirability of absolute independence of employées. Mr. Dolge puts the final touches on his manifold schemes with a reunion and banquet to his employées at the beginning of each year.

Mr. Dolge competed for honours at the Vienna Exhibition (1873), and was awarded the first prize (medal and diploma); at the Philadelphia (1876) he showed piano felts and felts for polishing, and gained two prize medals and diplomas, and at the Paris Exhibition (1879) he was awarded a medal and a diploma for both his exhibits in piano felts and sounding boards.

## Dyeing Cotton Brown with the Use of a Mordant.

It is well known that an orange colouring matter is obtained by combining tetrazodiphenyle (from benzidine) first with one molecule of salicylic acid, and acting with the thus formed intermediate product upon one molecule of resorcine. The patentees have found that this colouring matter is still able to combine with a further molecule of a diazo compound. By this reaction, new colouring matters are obtained, which dye, on cotton, brown shades without the use of a mordant. Example I. 47 kilos of new colouring matter from tetrazodiphenyle, salicylic and resorcine are dissolved in 4000 litres of boiling water, with an addition of 25 kilos of caustic soda (of 40° Bé). After cooling, 20 kilos of para-diazobenzole sulphonic acid, suspended in about 600 litres of water, are slowly entered into the alkaline solution. Thus, a colouring matter is obtained which is soluble with difficulty in water. Its precipitation is completed by adding a solution of common salt. It dyes cotton in deep brown shades without the use of a mordant. An identical colouring matter is obtained if the intermediate product formed by one molecule of tetrazodiphenyle and one molecule of salicylic acid act upon the colouring matter formed by one molecule of para-diazobenzole-sulphonic acid and one molecule of resorcine. To produce the new colouring matter by this method, 36 kilos of the colouring matter from para-diazobenzole sulphonic acid and resorcine are dissolved in 1000 litres of water, and to this solution an equivalent quantity of the intermediate product from tetrazodiphenyle and salicylic acid is added. To prepare the intermediate product, 19·5 kilos of benzidine are dissolved by means of 48 kilos of muriatic acid in 800 litres of water, and diazotised by 6·9 kilos of nitrite of soda; the solution of the diazo compound is then entered into a solution of 15 kilos of salicylic acid, 14 kilos of caustic soda (of 40° Bé) and 30 kilos of carbonate of soda in 1200 litres of water. After the mixture of the intermediate product and the above-mentioned colouring matter has stood for about twenty-four hours, it is heated, and the so formed colouring matter is precipitated by common salt, filtered, pressed and dried. It dyes, on cotton, deep yellow-brown shades without the use of a mordant. If in Example I. the para-diazobenzole sulphonic acid is replaced by meta-diazobenzole sulphonic acid is replaced by meta-diazobenzole sulphonic acid the resulting colouring matter dyes more yellowish brown shades. Example II. If, in the first method of Example I., the para-diazobenzole sulphonic acid is replaced by 25 kilos of alpha naphthylamine monosulphonic acid, a colouring matter is obtained, which dyes cotton red brown. An identical colouring matter is formed if the intermediate product from tetrazodiphenyle and salicylic acid acts upon the colouring matter from alpha-diazonaphthaline monosulphonic acid and resorcine. The production of the latter compound requires:—22·3 kilos of alphanaphthylamine-monosulphonic acid, 500 litres of water, 14 kilos of muriatic acid, and 6·9 kilos of nitrite of sodium. The diazo compound thus formed is entered into a solution of 11·5 kilos of resorcine, 26 kilos of caustic soda (40° Bé) and 7·5 kilos of carbonate of sodium in 300 litres of water. The different isomeric alpha-diazo naphthaline monosulphonic acids show in regard to the described reaction an analogous behaviour, and the corresponding colouring matters do not differ very much in regard to their shades in dyeing cotton with them. If the diazonaphthaline monosulphonic acids are replaced by the disulphonic acids of naphthaline no remarkable variation regarding their shades is observed. The isomeric sulphonic acids of the beta-diazonaphthaline, if employed instead of the alpha-diazonaphthaline sulphonic acids in the described reactions, yield colouring matters which dye cotton more of a yellow-brown. Colouring matters of similar shades are also obtained, if the mono or disulphonic acids of diazo-azobenzole or diazo-azotoluole are employed instead of the diazo-naphthaline sulphonic acids. Finally, it may be stated that, in each of the described combinations, the tetrazo-diphenyle may be replaced by tetrazo-ditolyle without any important change of the effect.

## Legislation Affecting Trade Combinations in Canada.

The *Canada Gazette* for the 11th May last publishes the text of an Act passed by the Canadian Parliament and Assented to by Her Majesty on the 2nd May last, for the prevention and suppression of combinations formed in restraint of trade. Article 1 of this law is as follows:—Every person who conspires, combines, agrees, or arranges with any other person, or with any railway, steamship, steamboat, or transportation company, unlawfully—(*a*) To unduly limit the facilities for transporting, producing, manufacturing, supplying, storing, or dealing in any article or commodity which may be a subject of trade or commerce; or (*b*) To restrain or injure trade or commerce in relation to any such article or commodity; or (*c*) To unduly prevent, limit, or lessen the manufacture or production of any such article or commodity, or to unreasonably enhance the price thereof; or (*d*) To unduly prevent or lessen competition in the production, manufacture, purchase, barter, sale, transportation, or supply of any such article or commodity, or in the price of insurance upon person or property—is guilty of a misdemeanour and liable, on conviction, to a penalty not exceeding four thousand dollars and not less than two hundred dollars, or to imprisonment for any term not exceeding two years; and, if a corporation, is liable, on conviction, to a penalty not exceeding ten thousand dollars and not less than one thouand dollars.

## ORIGINAL DESIGNS.

On our first plate, we give a design for a Lace Curtain, which is also suitable for other classes of curtains. The design is, of course, reduced, and may be produced in the size most suitable for the requirements of the user.

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On our second plate, we give one for Upholstery Fabric, suitable for either plush or silk. It represents a pattern twelve inches broad. This has been designed by Mr. R. Lord, 10, Ann Place, Bradford.

* * * * *

On our third is a design suitable for a Brussels Carpet, with a border of a distinct character from the body. As a five-frame carpet, the pattern would be effective.

## MONTHLY TRADE REPORTS.

WOOL.—At the London wool sales, the biddings have been very spirited, and prices have ruled higher. This has had an effect upon the wool trade generally, and, although the prices of English wools have not risen in comparison, staplers have been firmer in their demands, and rather more money has been given by consumers. The yarn trade has been brisk, spinners of nearly all classes having good orders on hand, and new business done has been at advanced rates. Makers of yarns spun from Colonial wools have, for some time past, been extremely busy, and there are no signs of a falling off in this branch of the trade. Mohair yarns are receiving much attention, and especially is this the case in the finer qualities. The piece branches have also been busy, and new orders have been refused unless at an advanced rate. Dress goods of soft yarns have been in much favour both in plain and fancy styles, and the same may be said of fabrics of a bright character. The sales of worsted coatings have been large for home as well as foreign account, and good orders have been booked during the month at rather firmer prices.

COTTON.—The markets during the past month have lacked animation, the prevailing high price for raw material acting very prejudicially upon yarns and pieces. Spinners and manufacturers have found the securing of orders of a paying nature very difficult to obtain, and, generally, those taken have been at rates which show little or no margin for profit. The former have been working recently upon orders secured some time ago, and, as these are being gradually completed, there is much anxiety about future business, especially amongst those engaged in the production of yarns for export to Eastern countries. The tone of the cloth markets has been quiet, although there have been a few producers who cater for the smaller foreign markets who have been well engaged, and have also taken good orders to last them for some weeks. Export to India has shown a decided falling off, the orders offered having been at very low rates. The same may be said of the China trade, and stocks of goods for these countries have accumulated recently. The home branches have been quiet, and the outlook on the whole is not very cheering.

WOOLLEN.—This branch of trade has been fairly busy: as has been the case for some time past, fine worsteds of a fancy nature still take the lead, and some large orders for Spring goods have been booked at rather higher prices. Merchants generally have offered large orders at old rates, but, with few exceptions, they have been compelled to give an advance before they could place their orders. In tweeds and such like fabrics, the business has been about as last month, some fair lines having been booked for Spring fabrics. The makes of cloths for the ready made clothing trade have been a shade quieter, but this is chiefly owing to merchants being engaged making up patterns for their travellers. A successful demand is shortly expected. During the past three months, a larger quantity of ready made goods has been disposed of than has ever been the case in the same period of time, and those interested in this branch of the trade are sanguine of business being equally as good during the next few months.

LINEN.—A decided improvement has been experienced in the linen trade during the past month. The finer qualities of table fabrics, which have been rather neglected for some time past, have had an improved inquiry, and manufacturers of this class of goods are sanguine that a better demand will result shortly. Towellings, toilet, tea and such like cloths have been much sought after, and the same may be said of sun blinds, and dairy and cheese cloth, the latter selling briskly. Drills, and bed-ticking have been about as last month. Hand made linens have only been quiet. Prices generally have a slightly higher tendency.

LACE.—There has been a want of animation in this branch, and competition is as keen as ever. The trade generally is in anything but a healthy condition, as profits are almost nil. The cheaper varieties of cotton goods have been in moderate request, but stocks continue to accumulate. The curtain and window-blind branches have been fairly busy, in fact, these are the only departments of the lace trade that have recently shown anything like a business state of things. Some very effective designs have been out lately and have met with a ready sale.

## Improvements in Dyeing Aniline Black.

An invention has been patented which relates to dyeing processes, wherein black is produced by the action of oxydising agents upon salts of aniline. In such processes, a part of the resulting black product is thrown out as a precipitate, which is not incorporated with the goods and, therefore, represents a waste of material. When the dyeing is effected by circulating or forcing the dyeing liquor through a mass of goods, the formation of this precipitate in the bath interferes with the success of the operation, owing to the goods acting as a filter, the separated precipitate being deposited upon the exposed surface of the mass, and checking the flow of the liquor, as well as preventing the obtainment of regularity and uniformity of effect. In carrying the invention into effect, the re-agents are so proportioned with relation to the aniline salt employed that a slow re-action results, such re-action taking place only, or almost entirely, within the mass The goods are saturated with the dye liquor and allowed to remain for a considerable interval, during which the re-action gradually takes place, as, for example, the goods may remain at rest for an interval of twenty-four hours, more or less. It is preferred to use the liquor immediately after it has been prepared, and to mix further quantities as it is required, so that there shall not be time for the formation of any material amount of precipitate before the liquor has been taken up by absorption. The goods are quickly saturated with the liquor, and then removed from the machine, or cistern, or bath, and placed in a warm room, or in a suitable place, to age for a suitable interval, during which the oxidation proceeds slowly, and the dye becomes fixed upon the fibres. During this resting of the goods, they slowly change, by the oxidation of the aniline, either to the green stage, or the black stage, according to the chemical agents which have been employed. In the one case, the goods must be further treated with a suitable oxidising agent, as, for example, with potassium bichromate, and, in the other case, the goods will only require to be rinsed. By way of example, the following proportions of chemicals are used in the preparation of a dye bath:—120 gallons of a five per cent. solution of aniline chloride, 20 gallons of a five per cent. solution of potassium chlorate, 15 gallons of a six per cent. solution of ferrous sulphate, and 4 gallons of hydrochloric acid of ordinary commercial strength, mixed together. This would furnish a bath consisting of 159 gallons of liquor, but, in some cases, a less quantity would be mixed at once, as it is considered that the best results are obtained when comparatively small quantities of the bath liquor are mixed at one time, and are used shortly after mixing. The goods to be dyed are saturated with this liquor until it has become absorbed, when a fresh quantity of liquor is mixed. The inventors confine themselves to the proportions stated so long as the proportions used are calculated to produce a slow re-action requiring several hours to complete. Other oxidising agents may be used, such, for example, as potassium or sodium bichromate alkaline chlorates, or hypo-chlorites bleaching liquor, or any other agent or agents ordinarily used, or which will produce the desired effect. The invention is suited to the cases wherein the goods are treated in machines in which the liquor is forced through, or is caused to percolate through the same. When operating with such machines, the goods are kept under treatment only until thoroughly saturated, when they are removed and placed away for an interval. Great economy results from the fact that relatively less oxidising agent and less acid are used and from the fact that the whole of the liquor mixed is absorbed by the goods during a lengthened operation and that, practically, all the dye is precipitated upon the fibres of the goods treated. The relative amount of acid used being much less than is employed in ordinary processes, the fibres are less injured or tendered than by the usual process.

## The Manchester Edison-Swan Company, Limited.

The annual meeting of the company has been held, and a report of a very satisfactory description made to the shareholders, from which we learn that, during the past year, there has been a considerable increase in the business done by the company, not only in the United Kingdom, but also abroad. The satisfactory working of the numerous electric lighting plants installed, and the growing demand for both arc and incandescent lighting, afford great encouragement for the future. The negotiations with the Manchester Corporation for the establishment of a central station in the city have been continued, but as yet without any definite result. The company have given the Corporation formal notice of their intention to apply to the Board of Trade for a provisional order, and, in the meantime, have asked their assent to an application for a license. The balance sheet shows that the net profit, including last year's balance, amounts to £2,754 11s. 7d., which it is proposed to appropriate as follows:—To payment of dividend at 5 per cent. per annum, £1,000; to reserve fund, £1,000; balance, £754 11s. 7d.—total, £2,754 11s. 7d.

LACE CURTAIN.

DESIGNED BY R. T. LORD.

UPHOLSTERY GOODS.

BRUSSELS CARPET.

# FASHIONABLE DESIGNS.

## Worsted Trouserings.

No. 591.

Warp:—1 end Twist, 2/40's worsted
1 „ Green, 2/32's „
1 „ Twist, 2/40's „
} 9 times.

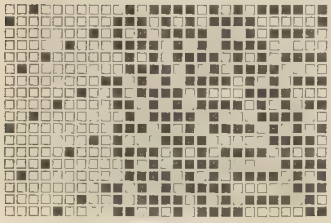
1 „ Black, 2/40's „
1 „ „ 2/32's „
1 „ „ 2/40's „
} 9 times.

1 „ Green, 2/40's „
1 „ „ 2/32's „
1 „ „ 2/40's „
} 9 times.

1 „ Black, 2/40's „
1 „ „ 2/32's „
1 „ „ 2/40's „
} 9 times.

108 ends in pattern.

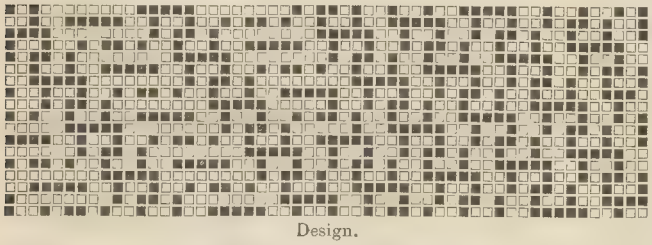
Weft:—1 pick Black, 2/18's worsted.
1 „ Blue, „ „



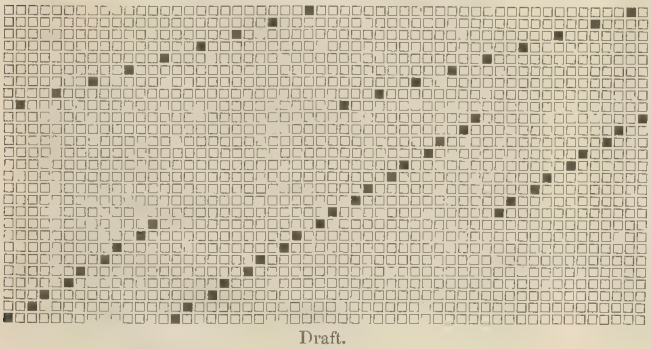
Pegging Plan.

6,720 ends in warp
104 „ per inch.
58 picks „
13's reed, 8 ends in a reed.
64½ inches wide in the loom.
56 inches wide when finished.

20½ oz. cloth.



Design.



Draft.

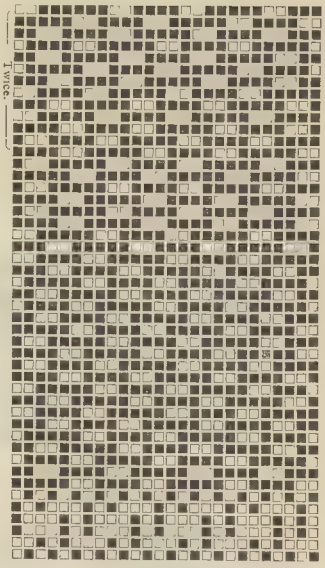
No. 592.

Warp:—14 ends Black, 2/36's worsted.
2 „ Yellow, 45/2's silk.
18 „ Black, 2/36's worsted.
6 „ Twist, 2/40's worsted.
18 „ Black, 2/36's worsted.
2 „ Red, 45/2 silk.

60 ends in pattern.

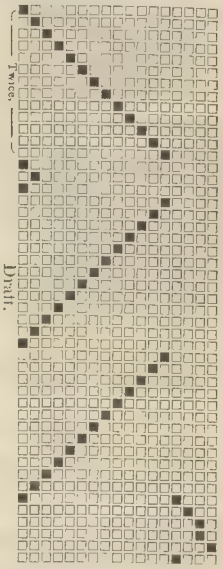
Weft:—All Blue, 2/36's worsted.

Design.



5,632 ends in warp.
88 „ per inch.
11's reed, 8 ends in a reed.
90 picks per inch.
64 inches wide in loom.
56 inches wide when finished.

16 oz. cloth.



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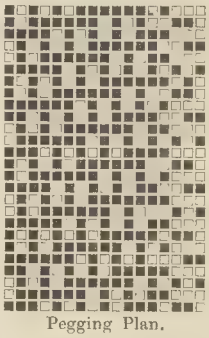


Pegging Plan.

## Woollen Suiting or Mantle Cloth.

No. 593.

Design.

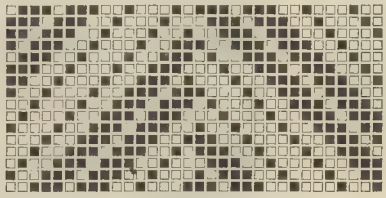
Warp:—
8 ends Drab, 15 skeins woollen.
2 „ Blue and White twist 2/14's worsted.
8 „ Drab, 15 skeins woollen.
2 „ White, „ „
4 „ Drab, „ „
2 „ White, „ „
4 „ Drab, „ „
2 „ White, „ „

32 ends in pattern.

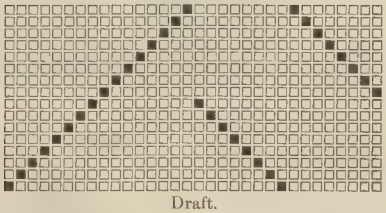
Weft:—
10 picks Drab, 14 skeins woollen.
2 „ Blue and White twist, 2/14's worsted.
10 „ Drab, 14 skeins woollen.
2 „ White, „ „ 1,920 ends in warp.
4 „ Drab, „ „ 30 „ per inch.
2 „ White, „ „ 7½ reed, 4 ends in a reed.
4 „ Drab, „ „ 32 picks per inch.
2 „ White, „ „ 64 inches wide in loom.
56 „ „ when
36 picks in pattern. finished. 17½ oz. cloth.

## Woollen Suiting.

No. 594.



Design.



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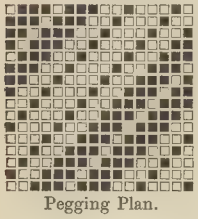


Pegging Plan.

Warp:—
14 ends White, 10 skeins woollen.
1 end Twist, 8 „
8 ends Olive, 10 „
1 end Twist, 8 „

24 ends in pattern.

Weft:—All Brown, 14 skeins.

2,304 ends in warp; 36 ends per inch; 9's reed, 4 ends in a reed; 32 picks per inch; 64 inches wide in the loom; 56 inches wide when finished. 25½ oz. cloth.

## New Silk Worms.

In Germany, for some years past, efforts have been made, and with considerable success, to acclimatize the oak silk worm of China and Japan—*Attacus Pernyi* and *Attacus Yama mai*. They have been raised in the open air, protected from the attacks of birds by nets of gauze or wire, and changed from place to place as the oak leaves are consumed. Late frosts and excessive dry weather have been injurious in depriving the worms of food. In California, a new wild silk moth, before unknown, has been found thriving on the poisonous species of *Rhamnus Californicus* or *R. Purshianus*. It produces a silk as good as that of the domesticated Bombyx. Owing to the favourable nature of the climate, without the frosts or rains of China and Japan, great hopes are obtained of propagating this species. In Yucatan, a wild moth has also been met with, somewhat allied to the mulberry worm, which produces silk of a bluish tint, but the gum which envelopes it is difficult to remove. Mr. John MacIntyre, a recent traveller in Manchuria, records having met with several new species of silk worms, which he describes in the *Chinese Times*. One wild worm feeds on the *Pinus chinensis*. It forms handsome cocoons, which yield a strong silk, but they are so mixed up with the needle-like leaves of the pine, that the winding off the silk would be difficult. On the walnuts, he found another, which forms a reticulated cocoon, like a Chinese lantern. He also met with two other species of mulberry worms, one very hardy, which could be fed on lettuce and dandelion leaves, and remains stationary; the other moves easily from branch to branch in search of food. The rearing of *Attacus orizabo* of Mexico is to be attempted in France.—*Journal of the Society of Arts.*

# Machinery, &c.

## Machinery at the Royal Agricultural Show.

An agricultural show is, perhaps, not exactly a suitable topic for review in the pages of a textile journal, but the one held a few days ago in the Windsor Great Park, by the Royal Agricultural Society of England, claims our attention from the fact that there was exhibited machinery which has an interest to textile manufacturers, particularly those displays made by Messrs. Robey and Co., Lincoln, and the Pulsometer Engineering Company, Limited, Nine Elms Ironworks, London, S.W.

### MESSRS. ROBEY AND CO.

This firm exhibited a compound "Robey" undertype engine, fitted with patent automatic governor and link expansion gear. This class of engine is specially suitable for driving electric light installations, and machinery in textile factories or other mills, where perfectly steady running is required. It is powerful, occupies only a small space, and works with perfect regularity under very varying loads. It is extremely economical in fuel, consuming under 2 lbs. of best Welsh coal per indicated horse power per hour. The working parts are perfectly balanced so as to run smoothly at high speeds. The wearing surfaces are of ample size, ensuring cool running under heavy loads, and the lubricating arrangements are all that one could wish for. An electric light plant was also shown, consisting of a vertical high speed engine coupled direct to a dynamo, suitable for use in mills, the arrangements being very advantageous where space is limited. They also showed a horizontal fixed engine, fitted with patent automatic governor and link expansion gear. This engine is suitable for working at from 80 to 100 lbs. pressure. The expansion gear gives a range of admission from zero to ¾ of the stroke, and ensures a perfect distribution of the steam. There is also another horizontal fixed engine, fitted with Richardson and Rowland's patent automatic trip expansion gear. As the result of a large experience with the different varieties of expansion gear, this patent trip gear was introduced, and it has been found the simplest, most effective, and most easily worked, and altogether gives more satisfactory results than any hitherto brought before our notice. This firm also showed a new design of vertical engine, the main bearings, blocks, and piston guides of which are cast in one piece with the engine framing, and are tooled by a special machine at one setting, so that all parts are made perfectly true. All the details are well made and finished, and the lubricating arrangements are well attended to. The engine is fitted with patent automatic governor and link expansion gear. Another new design was shown of a horizontal engine, with medium stroke, suitable for working at a pressure of from 80 to 100 lbs. This engine is made self-contained in one massive cast-iron foundation, on which are the main bearings. The crank-shaft is bent out of a solid bar of steel, and is especially strong so as to resist heavy strains without the risk of bending. The fly-wheel can be on either side, though it is best on the side opposite the cylinder, as the strain and wear are more equally distributed. If required, the fly-wheel can be on one side, and a driving pulley on the other. This class of engine is specially useful where space is limited, or where the foundations are not good, as, being self-contained, there is no chance of its getting out of truth with any settlement of the foundations. It can also be placed upon an upper floor, all that is required being to bolt it to the joists. This engine, too, is fitted with the patent automatic governor and link expansion gear described above. There was also shown a centrifugal pump, one of the main advantages of which is that the side cover can be removed, so that the working parts may be got to without disconnecting the piping. There were other exhibits, notably a "Robey" mining engine, possessing novel features of interest to those requiring an engine of this description; also a sugar mill and horizontal engine combined, and a stone breaker and ore crusher. Altogether, the exhibit was an admirable one, interesting not only to agriculturists, but to manufacturers and the community generally.

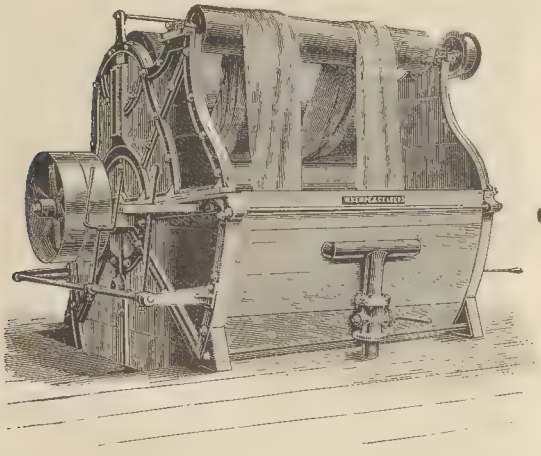
### THE PULSOMETER ENGINEERING COMPANY, LIMITED.

The Pulsometer Engineering Company, Limited, made a most excellent exhibit of the machinery for which they have secured themselves a wide name, the most attractive feature of which was a huge pulsometer steam pump, slung on poles, showing the method of using it for sinking operations. This odd-looking, but now well-known, appliance only requires the addition of a boiler and steam pipe to enable it to lift to a considerable height 80,000 gallons of water per hour. The convenience and portability of this pump have ensured its adoption throughout the civilized world, over 12,000 being already in use. A small pulsometer exhibited showed an ingenious modification of the steam inlet, a great economy having this year been introduced into the construction of the pulsometer, the steam having, by the *greI* arrangement, been made to be cut off at the proper moment, just as by the expansion slide of a steam engine, thus the steam is allowed to act expansively, saving nearly half its volume. A large quantity of water was thrown by a "Deane" patent direct-acting pump exhibited, of which the Pulsometer Engineering Company, Limited, are the sole makers in England. This pump is distinguished by the clever mechanical construction and certainty of action of its steam valve. Duplex pumps, now so generally in use, were shown. These are manufactured in all sizes by this firm, who are also manufacturers, under various patents, of the "Regenerative" ice-making machines, up to 100 tons of ice per day, and claim that their system produces ice at a lower cost than any other, but they only exhibited their

domestic ice-making machine ("The Champion,") on Fleuss' patent. This machine may find a fit place in every household where ice is consumed, and, for £8 8s. and £12 respectively, a machine is supplied which will ice water or make ice in three minutes. The convenience of these machines in country places, or in any country where ice in large quantities is not accessible, can hardly be over-rated. The "Sirenette" exhibited by this firm, is an instrument for producing a uniform sound, audible at long distances, and is adopted by the Admiralty for signalling purposes.

## Washing and Scouring Machine.

The firm of Messrs. William Kemp and Co., who have been makers of nearly all classes of machinery for the dyeing and finishing of worsted and woollen fabrics, at Holbeck Mills, Leeds, have recently been succeeded at those works by Messrs. J. Stead and Co., who are now producing the specialities for which the late firm have been so well known. Our notice has been drawn to several of their leading machines, amongst which, we found their washing and scouring machines of such merit that our readers will no doubt be much interested in them. From the illustration, the general features of the machines may be gleaned. In class I., the cloth is twisted into the form of a rope, and the power of the apparatus to express the grease and dirt is dependent upon the balance and weight of the top roller. This manner of washing and scouring is generally efficient, as, in the process, the crossing of the fabric reduces the creasing of the cloth to a minimum. But, as is well known, certain classes of fabrics

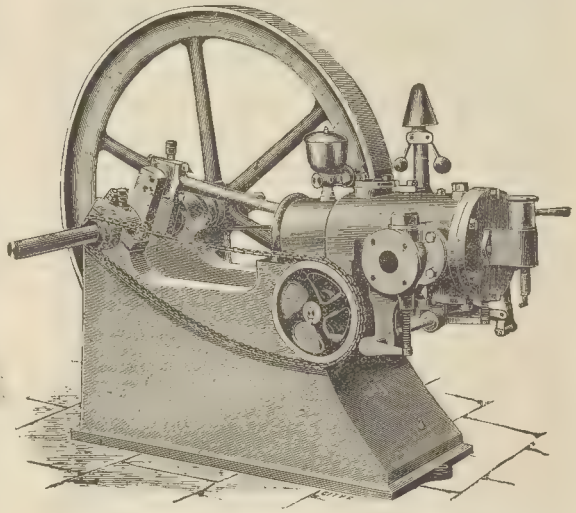


*Washing and Scouring Machine.*

require the scouring to proceed with the cloth in an open or extended state, and to meet this need, machines (class II.) have been produced which scour them in the extended manner. In the former machine, the cushion necessary for expressing the grease, which is obtained by twisting the cloth into the rope like form, is, in the latter class, obtained by making the squeezing rollers of iron covered with prepared India rubber. The machine (class I.) is mounted upon strong iron frames (cast from a new and improved set of models), with metal to metal joints (no wood packing used), lined up with the best pine 1½ in. thick. The squeezing rollers are made either of cast iron or of beechwood, with strong square wrought-iron shafts turned round at the ends, and running in gun-metal bushes fitted in improved pedestals. The seak trough is fitted with an improved sliding valve with galvanised iron guides, so as to insure its being perfectly tight and rustless. This is a very important point, especially in "washing off," as it prevents spots and stains, which cause so much annoyance and loss. Another noteworthy feature in the machine is the addition of their improved draughtboard, made of oak, with galvanised iron bolts, hinges, and rods, forming an automatic stopping and starting motion, reducing the liability of damaging the cloth to a minimum. Machine (Class II.) is mounted upon strong cast-iron frames, lined up with best pine, and fitted with two cast-iron rollers, covered with specially prepared India rubber, forming a uniform and continuous cushion across the entire width of the piece, for squeezing out the suds and dirt with which it is charged. The pressure upon the piece is regulated by screws working in spiral springs bearing upon the bushes of the top roller. These screws are connected by wheel work, which ensures a uniform pressure over the entire length of the roller; while a dial plate at the top of the machine indicates the gross weight operating upon the cloth, which can be increased or decreased as the fabric may require. It is also fitted with a tension roller worked by worm and wheel motion, guide roller, copper, steam, and water pipes, seak trough with improved valve, fast and loose driving pulleys, and belt motion complete. Messrs. J. Stead and Co. will be pleased to give full particulars of any of their machinery on application being made by users at their works.

## Whitaker's Silent Gas Engine.

There are a large number of different gas engines—good, bad, and indifferent—offered to users by various makers. Some of the best of these we have, on former occasions, noticed in the pages of our Journal. That a good gas engine is superior, taking all things into consideration, to a steam engine, where small power is required, is fully recognised. The first cost is more, but this is returned in the saving which is effected by the use of gas instead of coal. However this may be, it is of importance to users to be able to purchase a thoroughly reliable engine at the lowest cost, and that this is possible is shown by Whitaker's High Speed Silent Gas Engine. It would take up too much space to enter into a full description of this engine, but we will mention a few points which may prove interesting, and for further information we must refer our readers to the maker. The engine is made with either single or double cylinders, the illustration we give showing one of the former class. An important fact, which we must not omit to mention, is that there is only one ignition every three revolutions. This is a point upon which makers vary considerably—some engines igniting at ever revolution. In the method employed in this engine, the cylinder is kept clear of the old charge, and from 20 to 30 lbs. more pressure is obtained with the same compression than is possible in many gas engines, more particularly in some which ignite at every revolution. The engine is exceedingly economical, and, at the same time, reliable, and from the list before us we should say it is about the cheapest offered to users. It is adapted for all classes of work, is easy to manage, will start at a moment's notice, is noiseless, and contains no complicated parts. For many purposes, the single cylinder engine will be found well suited, whilst, for special purposes, the double cylinder engine is most adapted, particularly for working electric light installations. Those interested may obtain prices and full particulars from the maker, Mr. G. Whitaker, City Road, Manchester.



*Whitaker's Silent Gas Eengine.*

## Restoring Fulled Woollen Fabrics to their Original Dimensions.

In the fulling of fabrics, the shrinking varies considerably according to the nature of the fibres used and the time the material is acted upon in the process of fulling. After the operation is completed, the fabrics differ in width, and in the finishing processes have to be brought back by stretching, &c., to a required width. To accomplish this purpose, many well-known machines are used, and the process is varied according to the characteristics of the fabric and the make of the machine. A patented apparatus has been recently put upon the market in America, which, it is claimed, can accomplish the desired result in a more effective manner than is the case by processes generally in use at the present. The inventor has, of course, special machinery for the work, and he carries out the operation by different modes. The first process is stretching the fabric to the required width while being subjected to a moist heat at a temperature of about 212° F., the material is then dried gradually. Another process consists in first exposing the shrunken fabric to the action of steam, until the fibres are softened to the required degree, the steamed fabric is then stretched whilst it is in a moist and heated condition, and, finally, the drying process is completed, as in the first instance, by evaporating the moisture. A third process is carried out in the same manner as the second, with the exception of the drying of the fabric. This is accomplished by subjecting the steamed and stretched fabric to hot ironing, the heat being at a desired temperature.

## The American Excelsior Knitter.

A new knitting machine, which combines a number of inventions, is now being made in America. The salient feature of the machine consists of a simple arrangement of mechanism for holding the web during the knitting operation; that is to say, the machine will knit either in continuous circular or reciprocal knitting, without the application of weights to the fabric. This result is attained by the use of a needle cylinder having fixed hooks or web-holders arranged at its upper or knitting edge, which act in conjunction with needles having a lateral movement in their grooves, in addition to the usual vertical movement for performing the ordinary operation of knitting. This mechanism forms the substance of one of the patents. The lateral movement of the needles is imparted—through the agency of a *hardened steel* jack—by a cam in a cam-ring secured to, but free to rotate upon, the needle-cylinder. The jacks rest upon a ledge or shoulder formed in the jack-actuating cam ring, and, when so situated, is in its normal or projected position. In the upper portion of the needle cylinder, a circumferential recess is formed, the upper edge of which forms an angle of 45°, with a line drawn parallel to the axis of the needle cylinder. The jacks are placed in the needle grooves back of the needles, and, as a matter of course, are in contact with the said needles for their entire length, so that lateral motion applied to the jack will be imparted to the needle. The lower ends of the jack rest on the cam-ring, and the upper ends are in contact with the bevelled surface of the recess in the needle cylinder. The rotation of the cam-ring imparts a slight longitudinal movement to the jack, which also—at its upper end—has a lateral motion, due to the contact, and consequent cam-action, with the bevelled surface before alluded to. It will now be evident that, when the jacks are raised successively, the needles are projected laterally in like manner. The knitting operation is as follows:—When the needles are descending, having yarn in their hooks, they are forced towards the centre of the cylinder a sufficient distance to lay the yarn inside the web-holders, and immediately after casting their loops, and just after the ascent has commenced, they are projected forward, that is to say, in a line away from the centre of the needle cylinder. This movement carries the loop under the hook, and not only ensures perfect "knocking-over," but effectually prevents the loop being carried up with the needle during the ascending movement. The mechanism above described is all carried by the needle cylinder, which can be instantly removed, as in ordinary machines, for the reception of ribbed-top or stocking leg. It may also be stated that there are no unsightly additions to the needle-cylinder. To those familiar with machines of this class, it will be evident that a machine embodying these features will not only mean a greater production per machine, but that absolutely perfect work is assured without depending entirely on the skill and attention of the operator, which is the case with ordinary machines. In other words, if the needles are manipulated at proper times, good work must be the result, while, in ordinary machines, no matter how carefully they may be adjusted and the needles operated, unless the operator maintains a uniform and constant pressure on the web, in heel and toe knitting, drop stitches and other imperfections will surely result. It is claimed that inexperienced hands will learn to operate this machine in a day, and will then be able to make work *as perfect* as one who has had the experience of years. Other notable features exist in the machine which are almost of as great importance as that just described, for instance, the back needles are thrown out of action automatically, simply by pressing a button—which throws a cam in position to act upon the butts of selected needles, and by a partial rotation of the cam-ring, the exact number of needles are successively thrown out of action. This not only saves time and ensures uniformity, but prevents all damage to needles caused by the operator dragging them up by the hooks, which is the ordinary practice. Ward-off or fender-cams are also employed. These are small blades of steel, suitably journalled on the periphery of the cam-ring, protruding inward through a slot, and being spring-actuated, are free to yield in a direction obliquely to the path of rotation. By the use of these fenders, damage to the needles and needle-cylinder is rendered almost impossible, as the impingement of a needle is cushioned by the yielding cam, which recedes, and allows the needle to pass harmlessly under or over the knitting cams. The needle used is of special construction, having an extended shank which presents a very broad surface to the wear and strain imposed upon it, and fills up the groove completely in front and back of the butt. It is also entirely free from all tension devices, and moves with perfect freedom in the groove, a novel cam arrangement effectually preventing all erratic movements. There are many other novel points worthy of mention, which we will discuss briefly. The needle cylinder is not clamped, but is secured by a retaining cylinder, which ensures the exact centering of the needle-cylinder. The crank for imparting the reciprocal motion to the machine is capable of being thrown out of engagement with the driving shaft, and, consequently, need not go flying around with the shaft during tubular knitting. This materially decreases the jar which would otherwise result from the high speed of the machine, and removes all danger of the operator being struck by a rapidly revolving crank. Each machine is provided with a stop motion of most approved form, for regulating the length of leg and foot. The machine is peculiarly well built. The aim has been to present a machine which would be above adverse criticism from a mechanical standpoint. The cam construction is particularly worthy of mention. All the cams are $\frac{1}{4}$-inch thick, made of the finest steel procurable, and arranged and finished with an evident thought to long and lasting service. This machine is now in operation at Philadelphia, U.S.A.

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Five men belonging to Spalding and Weston, in the south of Lincolnshire—Messrs. Grey, Taylor, Mateman, Adlard and Rudkin—have just completed an extraordinary feat in wool clipping. In the course of five weeks, they have clipped the large number of 5,000 sheep, and also wound the wool as well. This is regarded as a very smart and big piece of wool clipping.

## Single and Double Carding.

Writing to "The Boston Journal of Commerce," upon the relative merits of single and double carding, a correspondent says:—In looking over the manufacturing news published in the trade journals, I find very few spinners putting in double carding. On the other hand, large numbers are throwing out their old machines and replacing them with an improved card for single work. This is just what was to be expected, in fact, what it has been gradually coming to ever since the combing machine was found indispensable for fine yarns. Year after year, the avenues of trade opened and extended by goods carded and woven from this system of preparation have been attacked on the one side by the comber, and on the other by the improved single card—the combing machine for counts above 80s. and the improved card working single for counts below 40s. The numbers spun between these bounds may be said to legitimately pertain to the field of double carding, and machines run on this method may be as yet profitably operated on these counts. Even these extremes, however, may be encroached on, for there are two or three firms named who are producing 70s from single carding. Cards which reduce the cost of production without injuring the quality, like all other machines for a similar purpose, must be greatly sought after, and will in a short time squeeze all others out of the trade. Still, there are claims put forward by those favourable to the double system that have not been met satisfactorily by the advocates of the single method. They say the effect of double carding on yarn is to make it smooth and glossy. The sharp points of the wire combing so often through the well-separated fibre make the gloss, and the freedom from dirt gives strength to the yarn. The main cylinder comes in close contact with the fibre, twice over, at the feed rolls, thus securing, at the most vital point, a double chance to weed out and remove the imperfections, and by the aid of the clothing being finer by many degrees than that of the lickerin, the separating and straightening is done more perfectly, and the fibres left in a condition to unite more closely in the twisting. They contend that the valuable disuniting and paralleling powers of this cylinder are taken from it, and transferred to a lickerin travelling at a less effectual velocity and covered with a clothing so coarse that it is impossible for it to handle the fibre in the same perfection. In the new style of machine, they hold that the main cylinder is no more effective in respect to stretching, disconnecting, and laying the fibres lengthwise, than a common roller; that the speed at which the feed rolls are driven destroys these essentials in a very marked degree, because of the infringement of the rules that govern the operation; the doublings, and thereby moving of the stock, and the effect which these have in imparting gloss and smoothness to the yarn, not being remedied in the subsequent processes, are in a great measure completely lost by the single system of procedure; that, in the endeavour to bestow a partial smoothness, the single machine is frequently made to card in the proportion of 60 to 1, thus softening the fibres at one end so that they are weakened to such an extent as to be unfit for drawing out fine; that, on the double operation, 30 to 7 is the maximum allowance; the fibres receiving this treatment with equal uniformity at both ends, are not over-carded, but in a much better condition to be drawn, and lie together more compactly and naturally in the twisting; that increasing the velocity of the cylinder, on cards made for single work, minus the lickerins, grinds the ends of the staples instead of combing them, while the other ends pass on thick and stubby, so that the following processes are unable to unite them in anything like the glossy condition which it is their natural tendency to assume, and that increased velocity adds to the waste through centrifugal force. It is asserted, by those who advocate the principles of double carding, that there are sundry happenings in practice which operate in favour of their system, such as the one process helping to amend the defects of the other. For instance, a poor set of clothing, or a rubbed cylinder, is no uncommon thing, and, on the single card, the sliver produced from this imperfection passes right into the yarn, without a chance to be corrected through a second process, while, in such a case, this sliver would be manipulated on a well clothed and sharpened cylinder if the double method were the practice. Single machines being less numerous on account of their greater capacity, it is held that the defective work of one is much more contaminating to the yarn than that of a common card would be. There is a certain speed at which they declare to run a card cylinder, and when passed, the fibre has a tendency to fly off, and no matter how securely the unoccupied portions are plated in, the cotton never has the same cling to the wire. Another, and perhaps one of the best arguments put forward by those in favour of this system is the double draught, and thereby the multiplied power for elongating and paralleling the fibres. It is by draught only that the fibres, which have been tangled and crossed so by ginning and picking, can be restored to anything approaching the original state. It must not be forgotten that the natural position of cotton is almost a perfect parallelism of fibres, and with our present methods of manufacturing it, from the time it leaves the boll, it is never again, however much it is carded and doubled, brought to be thoroughly parallel. The effect of the first processes is detrimental to the order in which the fibres had previously been arranged by nature. This straightening, it is asserted, cannot be accomplished in anything like as perfect a manner on a single machine, especially when its principal cylinder is deprived of its elongating powers by the introduction of lickerins. It is also said that the so-called improved card, which is becoming so popular, holds out an inducement to planters to grow a clean, and, there-

fore, a weak staple, rather than a strong, healthy plant that will produce a thread which will bear to be tested, and crack when it breaks. These are some of the most prominent objections brought forward by the opponents of single carding. It must be conceded that most of these arguments are pretty solid, and difficult to weaken from the logical standpoints taken. The best of our carders and superintendents, particularly those of older schools, unite in the opinion that straightening and uniformity are essentials to strong, even yarn; that carding from which a certain proportion of short is not taken tends to impart fuzziness and mars the appearance of the goods. Practice with single cards of the best make, has impressed us with the idea that some, if not all, of these arguments are more theoretical than useful essentials of the process. But what is to be advanced in behalf of single carding on the common style of machine, a business that is being carried on in a more extensive manner than one would suppose? There is really nothing to be put forward in defence of such a system except saving of cost, first, in machinery and power, and, second, in the wages of help. If it were only the very coarser grades of manufacture that carding single on these small machines was indulged in, an excuse might be found. But there is a cheap class of finer goods on the market got up this way, which has materially helped to popularise the improved single card.

## Thioflavine.

A new colouring matter, Thioflavine, has been introduced by Messrs. Leopold Cassella and Co., of Frankfort-on-Maine, of which we have received some excellent dye-tests. Thioflavine is sold in two qualities, Thioflavine T and Thioflavine S. The former is used for dyeing cotton mordanted with tannin and tartar-emetic, while the latter is used for dyeing unmordanted cotton. Thioflavine T is distinguished from all other yellow dye-stuffs by its pure greenish shade and its capacity to combine with other dye-stuffs, such as safranine, green blue, indazine, methylene blue, &c., producing shades which hitherto have only been obtained with difficulty, and this colouring matter possesses the additional recommendation that it dissolves easily and completely in warm water. For cotton dyeing:—Mordant with tannin and tartar-emetic, or any good substitute for the latter, and dye from cold to about 175° F., adding either muriatic acid, acetic acid, or alum. The brightest shades are produced by mordanting with colourless tannin and using muriatic acid in the dye-bath. Thioflavine T is fast to washing and acids, and its fastness to light is greater than that of all similar yellow dye-stuffs. For cotton printing, Thioflavine T is very suitable in consequence of its great resistance to heat, alkalies, and acids. Special recipes are given for this kind of work by the makers. On account of its resisting acids, it is of special value for satins, and other half-silk fabrics. Silk is dyed at a boiling temperature in the soap bath, and brightened cold with sulphuric acid. Light shades show a beautiful fluorescence. Wool is dyed in a neutral bath. On leather, the T quality produces a fine pure greenish yellow shade. In order to produce lakes or pigment colours with Thioflavine T, the colouring matter is precipitated with china clay, and thus yields a very fine colour. For paper, both in pulp and as a surface colour, Thioflavine T is very suitable. The silk dye-tests sent to us were made in a boiling soap-bath, rinsed in pure water, and brightened in a cold bath with sulphuric acid. The darker shades incline to orange, while the lighter shades are of a greenish tint, with a decided tendency towards fluorescence. The tests with T quality on bleached cotton, mordanted with pure tannin and tartar-emetic, are very good; those made with ½ % of dye-stuff are pure yellow, with, perhaps, a greenish tendency; the 2 % is a rich orange yellow. Thioflavine S gives different shades to Thioflavine T. According to the quality of the material to be dyed and the shade to be obtained, the unmordanted cotton is dyed in a bath rendered alkaline by either soap, soda ash, stannate of soda, or glaubers salt. In each case, boil for 30 minutes, and when dyed, wash well and dye in a room not exposed to the direct rays of the sun. The shades of Thioflavine S resist washing, and even strong alkalies, but are not so fast to light as Thioflavine T.

## Classification of Articles in Customs Tariff.

The following decisions affecting the classification of articles in the Customs Tariff have recently been given by the Customs authorities:—

Italy.—Small sheets of common wood, perforated for mechanical looms.—Category 170*b*. Duty, 13 lire per quintal. Woollen yarn, scoured, but not bleached.—Category 128*a* (1). Duty, 77 lire per quintal. Knitted woollen trousers.—Category 135*b*. Duty, 330 lire per quintal, with 40 per cent. additional for sewing. Strips of carded woollen tissue sewn and ornamented, with glass beads sewn on.—Categories 129 *a* (1) and 132*b*. Duty, 500 lire per quintal, with an addition of 50 per cent. for sewing, and 50 per cent as established in the differential tariff. Tissues of jute, dyed, glazed, having in warp and woof in a square of 5 millimetres 10 elementary threads or less.—Category 86*c* (1). Duty, 60 lire per quintal. Tissues mixed with silks, in the proportion of more than 12 and less than 50 per cent., black and coloured.—Categories 151*a* (2) (black) and 151*b* (2) (coloured). Duties, if black, 7 lire per quintal, and if coloured, 8 lire per quintal.

Switzerland.—Knitted tissues in the piece, or cut out, without needlework:—Of cotton, Category 291, duty, 50 francs per quintal; of linen, hemp, &c., Category, 304, duty, 16 francs per quintal; of silk, category 321, duty, 16 francs per quintal; of wool, Category 338, duty, 25 francs per quintal.

Greece.—There shall be exemption from import duties, and from any other State or Municipal taxes upon the cotton tissues employed in the making of head kerchiefs used by the women of Greece, when they are received from transit under the condition that the kerchiefs should be exported abroad, or stored in transit, within three months' time from the day in which the above-mentioned cotton tissues were taken. Whoever desires to enjoy this privilege of exemption must make a request to that effect in writing to the proper Custom collector, giving, in the meantime, security for the payment of the import duty and the other taxes, in the event of these kerchiefs being not exported, or returned into transit, within the above specified period of three months from the day in which the stuffs from which they are made was received.

Venezuela.—Linen or cotton stuffs, packthread, twine, or rope and hemp thread for fishing nets, pay a duty of 75 centimes of the Bolivar (9½d.) per kilo. Material for mosquito nets, woollen flannel, or mixed with cotton, white or coloured, linen holland, black or blue, and gummed cotton cloth for overcoats, pay a duty of 1 Bolivar 25 centimes per kilo.

United States of Columbia.—The Government of this Republic have decided to admit, free of Customs duties, samples carried by commercial travellers.

## Yorkshire College.

The Fourteenth Annual Exhibition of Designs and Patterns produced by students of the Yorkshire College designing and weaving departments was opened on the 28th ultimo, in the Textile Museum. Judging by the variety, comprehensiveness and character of the exhibits, we have no hesitation in saying that the work done during the year has been of a thoroughly practical nature, embracing every branch of the textile trade, and reflects great credit upon Professor Beaumont and the staff under his direction. The work shown by Messrs. Elliot Hinchliffe and Thomas H. Newsome, senior day students, are most praiseworthy. The original patterns exhibited by the former are artistic and æsthetic in style, and are well carried out, whilst those of the latter comprise figured velvets, woollen mantle cloths, and a fancy vesting—all of which are of original designs. The patterns prepared by the junior students, as well as those by the members of the evening classes, are well worthy of commendation. On the same day, a large number of day and evening students assembled to make a presentation to Professor Beaumont, who, we regret to state, has been, through ill health, compelled to resign the position he has for fourteen years occupied with so much credit to himself and benefit to the many students who have come under his direction. The presentation, made by Mr. A. T. West on behalf of the donors, consisted of an illuminated address, handsomely bound, and of an elaborately chased silver punch-bowl, bearing a suitable inscription. We have much pleasure in stating that Mr. Roberts Beaumont, son of Professor Beaumont, has been appointed to occupy the position left vacant by his father's resignation, and we have every confidence in saying that he is quite capable of fulfilling the duties of so important an office as that of Profersor of Textile Industries in the Yorkshire College, Leeds. The youths of this important centre could not do better than enroll their names on one of the various class lists of the school as their opportunities may allow, as the prizes in the manufacturing world fall, and necessarily so, to those who are best fitted to cope with competitors, and, therefore, no chance should be permitted to pass by of preparing to win.

## Book Notice.

THE PRACTICAL MANAGERS' SLIDE RULE COMPANION.

By James Hovell. *Dundee:* James P. Mathew & Co.

We have received a copy of the 2nd edition of the above work, which, since the publication of the first edition, has been revised and enlarged, and many problems have been added which are in daily use by those engaged in the textile and engineering trades. The work was written specially as a subject upon which an address might be given before the Dundee Managers' Association. In its present form, it contains a mass of most useful examples for the use of the slide rule, which, if studied by those interested, cannot fail to prove of great benefit. The advantages derivable from the use of the slide rule are not sufficiently understood, and, therefore, we have pleasure in recommending our readers to purchase this book.

An American contemporary says:—"It is by no means improbable that paper will yet supersede cotton and woollen cloth as the clothing material of the people. One establishment in the west is already doing an extensive business in the manufacture of paper clothing, and the fabric is said to equal that of any other class of goods in style and durability. For blankets, piano coverings, and similar purposes, the paper fabrics are an established success. They are light and serviceable. Paper pails, dishes, and canes are familiar to almost everybody. Paper boards for making houses, paper boats, paper waterpipes, column pipes, tanks, and a thousand other new uses are becoming popular. Paper made from wood pulp is becoming a very important article in manufacturing, and its products are being exported from this country to every part of the globe."

The flax industry of New Zealand, says the *Canadian Journal of Fabrics*, which has lain dormant for many years, has suddenly revived, and mills are being planted over a wide area of country. In the north of the island, thirty mills are in operation in one locality, and profits are proving to be large. The cultivation and manufacture of flax in Manitoba and the North West, for export to the Irish linen manufacturers, has frequently been discussed in these columns, and will now, it is to be hoped, be taken up in earnest. If the New Zealanders at their great distance can make the industry profitable, there should be no difficulty in Canada.

* * * * *

The *Adelaide Observer* for the 20th April last says that the exports of wool from the Australian Colonies for the season 1888-89 are approximately :—New South Wales, 411,000 bales ; Victoria, 311,000 ; New Zealand, 185,000 ; South Australia, 119,000 ; Queensland, 79,000 ; Western Australia, 20,000 ; Tasmania, 14,000. This shows an increase over the exports of the previous year, without taking into account the wool properly belonging to the season yet to come forward. Taking into calculation the severity of the drought and other drawbacks, which the wool producer had to contend against, the result of last season's operations and the extent to which this industry has grown, occupying such an important place in the commercial world, give great encouragement as to future prospects, and prove conclusively how pre-eminently suitable are the Australian Colonies for the production of the golden fleece.

* * * * *

Industrial legislatiou seems likely to be called for in Japan. Four years ago, the Japanese Government seriously considered the advisability of framing some regulations relating to the numerous mills springing up in all directions, and the conditions of employment in them ; but disinclination to interfere with young enterprises resulted in nothing being done. Attention has again been drawn to the subject by boiler explosions in factories at Kanazawa and Kyoto. An expert was recently sent by the Department of Agriculture and Commerce to investigate the former occurrence, and it appears that he has attributed it to the extreme age of the boiler and the ignorance of those in charge of it. A Japanese native paper asserts that in none of the factories in the Kaga districts is there a really competent engineer, and that the boilers are mostly old, and are never thoroughly cleaned. It is added that, since the accidents referred to, the factory girls are showing an aversion to work in the mills. It seems probable, therefore, that at least a system of compulsory boiler inspection will be established throughout Japan.

# PATENTS.

## Applications for Letters Patent.

| | | |
|---|---|---|
| Buffers for looms. J. Ingrams, London. | 17th June | 9,928 |
| Carding engines. J. M. Hetherington, Manchester. | 29th May | 8,930 |
| Combing machines. M. Firth and J. Robertshaw, Bradford. | 1st June | 9,082 |
| Cloth cutters. J. Phillipson and W. Leschziner, London. | 5th June | 9,334 |
| Combing machines. R. Haddan, London. | 5th June | 9,366 |
| Colours. J. Y. Johnson, London. | 6th June | 9,428 |
| Colours. J. Y. Johnson, London. | 6th June | 9,429 |
| Cop winding. S. Mason, London. | 7th June | 9,450 |
| Colours. F. Peterson, London. | 7th June | 9,488 |
| Combing machines. E. and E Pierrard, London. | 8th June | 9,556 |
| Cleaning flax, &c. E. Edwards, London. | 14th June | 9,855 |
| Cutting pile fabrics. L. Higginbottom, A. Goddard, J. H. Smith and T. Mannock, London. | 14th June | 9,863 |
| Carding engines. J. Shepherd and H. Midgley, London. | 18th June | 10,090 |
| Dyeing, &c., wool. S. Mason, London. | 3rd June | 9,149 |
| Dyeing fibres. J. Frost, Huddersfield. | 4th June | 9,254 |
| Damping warps. J. N. Ellis, London. | 6th June | 9,415 |
| Dyeing yarn in hanks. G. A. Greeven, London. | 6th June | 9,432 |
| Damping warps. A. and H. Stead, London | 8th June | 9,550 |
| Driving mechanism for roving, &c., machines. A. L. Briggs and J. Kirkham, London. | 11th June | 9,614 |
| Dyeing, &c., yarns in cops. A. Graemiger, W. T. Whitehead, S. Mason and E. Leigh, London. | 12th June | 9,692 |
| Dyeing yarns, &c. W. E. Heys, Manchester. | 14th June | 9,836 |
| Dyeing mordant. H. H. Leigh, London. | 17th June | 9,919 |
| Dyeing, &c., wefts. R. Armitage, Bradford. | 17th June | 9,946 |
| Drop box motion for looms. W. H. Hacking, Bury. | 17th June | 9,957 |
| Fast and loose reed motion for looms. T. Singleton, London. | 29th May | 8,912 |
| Fire extinguishers. A. F. Nagle, London. | 30th May | 9,071 |
| Fastener for textile fabrics. G. Tucker, Birmingham. | 4th June | 9,248 |
| Fabric for press bagging. G. Marchetti and J. Dyson, London. | 5th June | 9,368 |
| Fans. W. Matthews and J. Yates, Manchester. | 8th June | 9,526 |
| Frames for seal skins, &c. B. Shaw, Huddersfield. | 11th June | 9,585 |
| Finishing cord and twine. J. Cheyne, London. | 11th June | 9,637 |
| Fire extinguishers. J. Clapp, London. | 11th June | 9,649 |
| Finishing laces, gauzes, &c. C. J. Cox, London. | 12th June | 9,703 |
| Fabrics on lace machines. E. Daveniere, London. | 14th June | 9,774 |
| Flyers for roving frames. D. Nicoll, London. | 21st June | 10,139 |
| Gauze fabrics. F. E. Nonegger, Manchester. | 7th June | 9,458 |
| Gassing yarns. T. Rivett, Manchester. | 8th June | 9,534 |
| Gig machines. C. E. Moser, London. | 22nd June | 10,177 |
| Hosiery fabrics. W. T. Rowlett, London. | 1st June | 8,788 |
| Jacquards. S. D. Robinson, C. H. Dracup and T. Dracup, Bradford. | 28th May | 8,826 |
| Jute rugs and mats. D. W. Baxter, London. | 5th June | 9,364 |
| Jacquards. W. J. Cheetham and S. Sutcliffe, London. | 8th June | 9,548 |
| Jacquards. H. Ainley, Huddersfield. | 11th June | 9,582 |
| Jacquards. G. Wright, Bradford. | 12th June | 9,669 |
| Knitting jackets, &c. B. W. Russell, London. | 5th June | 9,337 |
| Knitting clothing, &c. C. Dawson, London. | 5th June | 9,344 |
| Knitting machines. J. Jardine and J. Dalby, Nottingham. | 6th June | 9,401 |
| Knitting machines. A. E. Adams and J. Hallam, Leicester. | 7th June | 9,439 |
| Knitting machines. W. J. Ford, Leicester. | 14th June | 9,781 |
| Knitting machines. F. and T. Jordan, London. | 14th June | 9,808 |
| Knitting machines. E. A. Hantz-Nass, London. | 14th June | 9,864 |
| Looms. C. Kreissig, L. Sontag and O. Hartig, London. | 7th June | 9,470 |
| Looms. W. P. Thompson, London. | 12th June | 9,690 |
| Measuring and marking fabrics. J. T. F. Bishop, London. | 22nd June | 10,202 |
| Opening and cleaning cotton, &c. B. A. Dobson, W. Hamer and W. Butterworth, Manchester. | 5th June | 9,326 |
| Pile fabrics. H. A. Foster, Halifax. | 28th May | 8,753 |
| Pile fabrics. J. J. Shiers and C. Marse, Manchester. | 1st June | 9,101 |
| Placing paper tubes on spindles. A. J. Boult, London. | 3rd June | 9,186 |
| Pattern boards. B. Akam, Bradford. | 7th June | 9,446 |
| Reeling. T. Rivett, Manchester. | 8th June | 9,503 |
| Spindles. H. Forrest, J. Robinson and T. Forrest, Bradford. | 29th May | 8,924 |
| Shuttles. J. Elsas and H. Weissenburger, London. | 30th May | 9,057 |
| Stop motions. T. McKernan, Rotherham. | 4th June | 9,220 |
| Spinning cans. G. Stiehle, London. | 4th June | 9,235 |
| Stop motions for beaming machines. A. Hitchon, Halifax. | 4th June | 9,243 |
| Stretching fabrics. G. Taylor, London. | 6th June | 9,405 |
| Shuttles. J. Gregson, Preston. | 7th June | 9,455 |
| Shuttles. G. Halstead, London. | 11th June | 9,609 |
| Spinning and twisting. J. Clay, London. | 12th June | 9,671 |
| Shuttle guards. P. H. Marriott, Manchester. | 12th June | 9,677 |
| Sizing yarn in hanks. T. L. Daltz and T. Sykes, Manchester. | 14th June | 9,787 |
| Shuttle boxes. W. Smith, Manchester. | 17th June | 9,963 |
| Spindles. W. F. Reynolds, Belfast. | 18th June | 10,024 |
| Shuttle tongues. J. Waddington, Bradford. | 21st June | 10,077 |
| Spinning fibres. M. A. and J. Porritt and W. H. Fenton, London. | 21st June | 10,129 |
| Streamer for connecting healds to jacks of looms. T. Pickersgill, Huddersfield. | 21st June | 10,077 |
| Stop motion. J. Vickerman, Huddersfield. | 22nd June | 10,173 |
| Shrinking device for looms. O. Hoffman, London. | 22nd June | 10,213 |
| Time checking apparatus. J. and J. N. Leber, London. | 30th May | 9,073 |
| "Turning up" rollers of scouring machines. C. Dean and A. Holmes, Huddersfield. | 5th June | 9,315 |
| Treating cotton, &c. R. S. Burn, Stockport. | 17th June | 9,904 |
| Toilet covers, &c. R. and J. Entwistle, Manchester. | 18th June | 10,025 |
| Winding yarn on bobbins. A. Garner, London. | 28th May | 8,739 |
| Working healds. G. H. Hebblethwaite, Halifax. | 30th May | 8,969 |
| Warp size machine. R. W. Goddard, Bradford. | 8th June | 9,521 |
| Warp balling machines. J. J. and J. Sunderland, London. | 17th June | 9,889 |

## Patents Sealed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4,576 | 6,679 | 7,220 | 7,424 | 7,425 | 7,464 | 7,704 | 7,828 |
| 10,250 | 3,092 | 3,151 | 5,277 | 7,720 | 16,518 | 4,887 | 7,512 |
| 7,844 | 7,997 | 8,018 | 8,061 | 8,212 | 8,231 | 8,322 | 10,567 |
| 2,351 | 3,269 | 3,685 | 3,689 | 3,884 | 5,701 | 6,209 | 8,308 |
| 8,395 | 8,436 | 8,459 | 8,615 | 9,135 | 10,811 | 15,349 | 16,713 |
| 17,734 | 2,861 | 3,353 | 4,232 | 4,317 | | | |

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AND
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## Contents.



## Notices.

The Yearly Subscription—payable in advance—including home postage, is 10s. Cheques and Post Office-Orders to be made payable to H. & R. T. LORD, 10, Ann Place, Little Horton Lane, Bradford, Yorkshire.

The Publishers will be happy to receive intimations of New Inventions, Patents, &c.

The Publishers are open to receive, from Designers, Original Designs of Carpets, Damasks, Tapestries, Linen, Cretonnes, &c., and such as are accepted will be published with the Designer's name affixed. All Designs sent for approval must be 10 inches long by 7 inches wide for single page, and for double page, 16 inches by 10 inches, and must be accompanied by Postage Stamps sufficient to pay return Postage in case they are rejected.

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Readers are invited to forward items of interest to the Trades concerned.

The Proprietors will feel greatly obliged if any of their readers, in making enquiries of, or opening accounts with, Advertisers in this paper, will kindly mention the *Journal of Fabrics and Textile Industries* as the source from whence they obtained their information.

## New Patented Fabrics.

### IMPROVEMENTS IN THE MANUFACTURE OF LACE AND OTHER RETICULATED AND WOVEN FABRICS.

An invention has been patented relating to improvements in the manufacture of lace and other reticulated and woven fabrics made of silk, wool, mohair, or of other animal fibres; or of cotton, jute, hemp, flax, or other vegetable fibres; or of gold, silver, or other metallic wire, tinsel, or drawn metals, mixtures, or alloys, which are used for embroidery, dress, or other purposes, and also in the preparation of yarns, so that they can be used in weaving or embroidering of fabrics, either by themselves, or in combination with other yarns not so prepared, for the purpose of obtaining novel effects in the finished article. The principal object of this invention is to produce a kind of lace or other fabric, but it is also applicable to the production of other fabrics, which may be woven or felted in such a manner as to permit of a portion of the woven or felted fabric being removed, the remainder still maintaining its position. For one of the purposes of the invention, a suitable groundwork or base is prepared of cotton, or other vegetable fibre, which is immersed in a chemical solution which renders this base capable of disintegration, or carbonisation, under the action of heat. After this base is dried at an ordinary drying temperature, it may be cut up into any required lengths, or the lengths themselves may be specially prepared as above, and upon this base a pattern is afterwards embroidered in any of the materials before mentioned, by means of an embroidering machine, or by hand, care being taken that the continuity of the pattern shall be such that there are no isolated pieces of embroidery, but that all the adjacent parts shall be so connected together and supported that they would form a lace, or other reticulated fabric, of the material used, if the whole of the ground or base upon which it is worked were removed. After the fabric has been embroidered, or the weaving and felting completed, the whole of the base, with the embroidery upon it, is subjected to a temperature of 200° Fahrenheit, or thereabouts, and, by means of this heat, the base which has been acted upon by the chemicals is disintegrated or carbonised until the whole of it is capable of being reduced to a fine powder or dust by any mechanical process of beating—agitation, or shaking. This mechanical agitation may be preformed in any suitable way, and the lace is then left with the base entirely removed, and may be dyed or finished in any required manner. By this process, which uses the chemically prepared base at as low a temperature for the destruction of this base as possible, the materials which are used for embroidering are not injured in any appreciable degree, nor subjected to the injurious action of any chemical process, so that the embroidered figures may be made of materials which have been dyed, or possess different colours in themselves, and these colours, as arranged in the embroidery, will be but little affected by the process of the disintegration of the base; and, in this manner, an almost infinite variety of different coloured and other figures may be produced in the finished article.

For the other purpose of the invention, in the production of the yarns which are to be used in making certain woven laces and other fabrics, the yarn itself, before it goes into the machinery or is used by hand for the purpose, is subjected to a chemical process similar to that which is used for preparing the base as before described and, after the process of manufacture is complete, this yarn can be removed out of the structure by subjecting the fabric to a temperature of 200° Fahrenheit, or thereabouts, so that, in cases where it is necessary, the whole base itself may be woven out of this prepared yarn, but its principal application as a yarn is intended to be for use in that class of woven or knitted lace fabrics into which, during the process of weaving or manufacture, certain threads of cotton, or linen, or other vegetable fibre, are introduced, called "draw" threads or "drag" threads, for the purpose of forming peculiarities in the pattern. These draw threads, not being required to appear in the finished article, have hitherto been removed from the fabric either by the hand or by mechanical means of a tedious and expensive character, but, by the use of this invention, these draw threads, being chemically prepared before they are used, can be removed without any difficulty by simply warming to the temperature above described for a suitable period of time, and by beating and shaking or other suitable mechanical process. In the preparation of the base upon which the embroidery, as before described, is afterwards to be worked, a piece of cotton, or other cloth made out of a vegetable fibre, having a cellulose base, is taken and immersed in a solution of aluminium chloride. The solution itself which has been found to answer the best for thin cloth, or muslin, such as is used as the base on which to embroider patterns for fancy laces, is one of aluminium chloride in water, the solution having a density of about 8° "Twaddel," or thereabouts, but it is obvious that the strength of this solution may be made to vary with the character of the cloth which is used for the base. Aluminium chloride has been found to be the most advantageous, because, when the cloth is dipped in this solution and afterwards dried at the lowest drying temperature, which ought never to exceed 80° Fahrenheit, or thereabouts, it neither alters the appearance of the cloth, nor injures its tenacity, so that it can be made in large quantities, and, if kept in a cool place, will remain comparatively uninjured until required. The solution works best somewhere about 60° Fahrenheit, though, with thicker cloth, the temperature may be used rather higher. The patentee, however, does not confine himself to the use of aluminium chloride, because several other similar metallic chlorides, such as zinc chloride, and others well known to chemists, will answer the purpose, though not so well: the cloth can also be dipped in very weak solutions of sulphuric, hydrochloric, or other mineral acids, or mixtures of them. When these acids are used, the best results are obtained with a mixture of the ordinary liquid hydrochloric acid, or sulphuric acid of commerce, with about 60 times their volume of water, but, in this case, as in the case of the aluminium chloride, the strength of the solution may be made to vary with the nature of the base which is employed for the embroidering purposes, and the length of time which must elapse between the base being thus chemically prepared and its use for embroidery. In cases where these acids are used, the very greatest care must be taken to dry at the lowest possible temperature, otherwise, the tenacity of the fabric will be injured before it can be used, and, as the acids will not keep well even under the most favourable circumstances, aluminium chloride is the salt which by preference is employed. In cases where the embroidery yarns are of delicate nature or colours, it may be necessary to size the prepared base, so as to prevent contact of the chemically prepared base with the material forming the embroidery—so that, when the decomposition of the chemical used in the base occurs, it will communicate with the embroidering in the least possible degree. In the preparation of yarns for weaving a base, where it is not woven first and prepared afterwards, the strength of the aluminium chloride and the temperature at which it is dried are exactly the same as in the case of its employment for preparing the base as before described. The same precautions, when any other re-agent than aluminium chloride is used, such as the acids before mentioned, must be observed with regard to drying and immediate use, otherwise the yarn will be tendered. When the yarn is prepared with aluminium chloride, after it has been thoroughly dried, it may be required to be sized, and this, in some instances, is advantageous where very delicate tissues have to be used in the embroidery, so as to prevent, as far as possible, contact between the embroidered threads and the base upon

which they are embroidered. The disintegration of the fibre, by the decomposition of the aluminium chloride, occurs beneath the coating of size, which does not appreciably interfere with the removal of the disintegrated fibre after the heating operation hereinafter to be described has taken place. In all cases where yarn is thus prepared, it must be dried at the very lowest possible temperature. As soon as the base has been chemically prepared as before described, and is thoroughly dry, the operation of embroidery upon the surface may be commenced, and this embroidery may be done in any of the materials before named, or in mixtures of them, and in any colours which may be required, or in any mixtures of them. The embroidery is then taken out of the frame, if, it has been done by a machine, and placed in a chamber where the temperature is 200° Fahrenheit, or thereabouts. The operation may be conducted at even 100° Fahrenheit, and at all intermediate stages, but, where a lower temperature is employed, a greater length of time is required. As a rule, in this case, the lowest temperature which can be employed for the fabric is the best, because it has the least injurious effect upon the embroidery which is worked on the base, and thus neither injures its lustre nor its colour. The length of time to which the embroidery is to be subjected to this temperature depends on the nature of the base, a longer time being required for thick than for thin fabrics. The completion of the operation, at which point the prepared base is completely tendered, or carbonised, so as to be ready for the disintegrating operation is usually indicated by a slight change in the colour of the base—if it is white, to a greyish or brownish yellow grey hue—but the best method of determining how long the heating process must be employed is to take a small portion of the base off one of the pieces and rub it between the fingers, and as soon as the base crumbles to dust when rubbed, no advantage is gained by carrying the operation of heating further. In some cases, the operation of heating the fabric so as to disintegrate or carbonise the base is best performed by passing the fabric round rollers heated by steam or otherwise, the fabric being covered with a coating of cloth on the outside so as to retain the heat in the base. The various methods before described of applying the heat must be determined by the nature of the fabric which is to be heated; but it will be seen that in long lengths, by this process, the operation may be made continuous. In most cases, where a moderately fine base is employed, twenty minutes, or thereabouts, is a sufficient length of time to complete this operation. As soon as this result is obtained, the fabrics are removed from the heating chamber, and the whole of the base is easily taken away either by subjecting the tissue to a blast of air, or to a jet or spray of water, or to dry steam, or the fabric is placed between two pieces of thick cloth or other material, or is wrapped up in the cloth so as to preserve the reticulated fabric, and is beaten until the whole of the carbonised cotton base is removed in the form of fine dust, leaving the embroidery in the form of an open lace or reticulated fabric, which is then ready for dyeing or finishing as the case may be. The process, when the wrapper is used, is materially assisted by frequent removal of the fabric from the wrapper, and by shaking the fabric either by hand or otherwise, which assists in the removal of the dust. Care should be taken to prevent this dust from coming freely into the place where the operation is carried on. Where fabrics are to be treated which are not embroidered on a base, but the prepared yarn has been woven or worked into them in the operation of their manufacture, the same method of removing the yarn, whether in the form of draw threads or as a part of the fabric itself, is employed, and the finished manufactured article is subjected to the same range of temperature as before described, and, by any of the mechanical means which are given, the disintegrated and now useless threads may be removed.

## IMPROVEMENTS IN THE MANUFACTURE OF LACE, GIMP, OPENWORK FABRICS, AND ANALOGOUS ARTICLES.

The process which constitutes the object of the present invention is applicable to embroidery, woven or knitted fabrics, tulle, articles of trimming, and to all combinations of textile or metallic threads obtained by weaving, plaiting, knitting, or other process. It consists in destroying chemically a more or less important part of the threads, which have served to weave or manufacture these different articles, with the object of obtaining new products, distinct from the original products, and which could only be obtained with difficulty, or imperfectly, without the aid of these auxiliary threads, which are caused to disappear after the weaving or manufacture. Amongst these applications may be mentioned the manufacture of lace or gimp, made at first in the form of embroidery upon a light ground, which is afterwards completely dissolved by a chemical agent, without affecting the embroidery. This application will now be described as an example. The groundwork employed is a pure silk fabric, and as light as possible, so that there may be less matter to dissolve; it is sufficient if it is strong enough to receive the embroidery, which can be made with textile, or metallic, threads of all colours and shades, plain or combined. The dissolvent is an ammoniuret of copper, prepared specially for this use by means of a solution of a hydrocarbonate of copper in ammonia, which permits of diluting the liquid, according to the more or less powerful effect which it is desired to obtain, in order to suit the material of which the embroidery is composed. When this material is of silk, it is necessary to protect it against the action of the dissolvent—this is done by giving it a charge of salts of lead, tin, or any other matter used in dyeing for charging silk. This charge will be applied by known processes, either before or after dyeing, according to the nature of the latter. No protection is necessary for textiles other than silk, no more than for metallic threads. The mode of carrying the invention into effect is as follows:—The embroidery is rolled spirally upon a cylinder of wire cloth, which is rotated slowly around a horizontal axis, and plunged at its lower part into the dissolvent with which the embroidery is thus put in contact by intermission—this facilitates the operation, enables its progress to be followed and to be arrested at the proper time, that is to say, when the ground or foundation is completely dissolved. A cleansing or washing with ammoniacal water then completes the removal of every vestige of the foundation or ground, and the lace when rinsed in pure water remains clear and completely perforated. There now only remains to revive the colour or the metallic lustre, which has been modified by the dissolvent; this is effected, for textile fabrics, by their immersion in an acid bath containing a salt of tin or of alumina, according to the nature of the colour, and for metallic laces, in a bath of alum and cream of tartar. A final washing finishes the lace, which is ready to receive the dressing in the ordinary manner. With respect to tissues, tulles, knitted articles, nets, and articles of trimming, it is easy to understand that they could be transformed into new products by destroying, by the process above described, a part of the threads which have served to weave or manufacture them. These latter will be always of pure silk, and as light as possible. The threads to be preserved will also be textile or metallic, in all colours or shades, plain or mixed: when they are in silk, they will also be protected by a charge in dyeing. Nothing will be changed with respect to the ordinary processes of weaving or of manufacture of these articles, except the convenient grouping of two categories of threads according to the effect to be produced. The destruction of the useless threads will be effected, by the process already described, by always modifying the mechanical part of the operation according to the form and the dimension of the articles. For fabrics in the piece, the dissolvent or reviving baths will be prepared in troughs provided with rollers, analogous to those employed in dyeing, boiling, or washing fabrics.

## AN IMPROVEMENT IN THE MANUFACTURE OF FELT CARPETS AND "UNDERFELTS."

The principal object of this invention is to manufacture an "underfelt" of a fire-proof nature so as to resist the progress of a fire through the floors of a building, but the same invention is also applicable to the manufacture of fire-proof felt carpets. The fabric known as "underfelt" is a soft, thick, loosely felted material, which is used for placing under an ordinary felt or other carpet for the purposes of increasing the durability and improving the softness, as well as for excluding cold air and increasing the warmth and comfort. In the manufacture of this fire proof "underfelt," about forty or fifty per cent. (more or less) of a mineral fibre—"Asbestos" or "Amianthus"—is mixed with the wool, or other animal fibre, or with the flax, hemp, or other vegetable fibre, or with a mixture of both animal and vegetable fibre combined. The mineral fibre is mixed with the animal or other fibre before carding, and the compound fibres so mixed are placed in the carding engine together, and are carded and felted in the usual manner so as to produce the fabric known as "underfelt," or the Asbestos or Amianthus may be mixed with the animal, or other fibre, after carding, and before felting, and it will be found that this combination will render the felt impervious to fire, even if the floor should be on fire, the flames would not pass through the "underfelt." It will be evident that, by the same process, the ordinary felt carpets for dyeing and printing may also be made fire-proof or fire-resisting.

## THE MANUFACTURE OF A NEW OR IMPROVED FABRIC.

This invention relates to the manufacture of a certain fabric, of a new class or kind, composed of linen and wool, or of cotton and wool, the object being the production of a cloth or fabric having on one side a surface practically all of linen or cotton or other suitable material, and on the other side a surface of wool, or imitation flannel, by which the effect and comfort in wear of real flannel is obtained at a less cost, and other advantages, such as durability, are gained. This new kind of fabric is applicable for shirtings, sheetings, underclothing, dress goods of various descriptions, and the like. The invention relates to the combining together, and application *seriatim*, of the processes of manufacture, and finishing described below, and to the production resulting therefrom of the new kind of fabric to which reference has been made. A cotton or linen warp and a woollen weft are woven on an ordinary loom in such a way as to bring cotton or linen to one surface, while wool is brought to the other surface, of the fabric, and this may be advantageously done by working the threads in the manner technically known as the "five or seven shaft satin," or "satin face." The linen or cotton yarn, before being used in the warp, should be first bleached or dyed, if a white or coloured, or striped, surface is required, because, if this bleaching or dyeing were afterwards effected, the wool would be injured. On removal of the fabric from the loom, it is subjected to the processes of milling, scouring (and stoving if a white product is required), and is finished practically in the same manner as ordinary flannel. The result of the employment of these processes will be a double faced fabric of a kind not hitherto known in the market, and which is capable of being worked

or used as ordinary cotton, linen, or flannel. Any desired quality and weight of the finished fabric may be obtained by varying the thickness of the yarns, and the "reed and pick" used, whilst it is obvious that a striped pattern may be introduced if desired, or the material may be subsequently printed on either or both surfaces.

### ELASTICITY OF WOVEN FABRICS.

This invention relates to means, by special treatment, of giving to fabrics, woven with warp and weft, an elasticity like that of knitted fabrics. It has been patented in this country by a French firm. In carrying out the process, the fabric, which is preferably of a ribbed kind, is gathered into rope form and fulled by passing it for nearly an hour between rollers revolving in a soap bath, at a temperature of about 50° C. This has the effect of narrowing the web, and rendering it elastic and supple. It is then similarly treated in a bath of soda solution, about 10 per cent. strength, so as to remove most of the soap, which would affect the dyeing, and the soap and soda are then thoroughly removed by rinsing the material in hot water. Whilst still moist, it is fixed by heat to its narrowed width, either by plunging it into boiling water, or by exposing it to steam. As the fabric thus treated could not be thoroughly singed because the flame would not reach the bottom of its furrows, the operation is performed before being treated as described. After the treatment, it may be dyed. The patentee says that woollen fabrics of almost any kind may be thus rendered elastic, but those made from carded wool, especially for their warps, are to be preferred. Although a soap bath is named as that which may be employed for fulling the fabric, other baths may be used which have a similar effect in gathering it into a narrower width.

## Cotton Mills in Brazil.

United States Consul-General Armstrong, of Rio Janeiro, writes the States Department at Washington as follows:—"The most important manufacturing industry in Brazil is that of cotton fabrics, there being, it is said, about one hundred factories of these fabrics in the Empire. These factories, when properly situated and well managed, should not fail to prosper, as there are many circumstances to favour them. There are in this Empire vast tracts of land admirably adapted to the production of the raw material, which, in fact, is produced in abundance. The consumption of the fabrics manufactured therefrom is larger than that of any other class of manufactured goods. The exportation of the raw material is expensive, as it has to pass through several hands and to pay heavy tribute in the form of commissions or intermediary profits, freights, export duties, and other burdens, to which it is subject. The importation of the manufactured article is burdened, in turn, with heavy expenses of the same kind, including very high import duties. All these expenses give the Brazillian manufacturer a wide margin for profit, even after taking into account the difference between the cost of manufacturing here and that in countries where labour, capital, machinery, &c., are cheaper. If some of the cotton factories in Brazil have failed to prosper, this is due to incompetent administration or improper location. As a general rule, the factories which are most successful are those that are not organised on too large a scale, and are situated in the midst of cotton-producing districts. Of the cotton factories in this Empire, 20 are in the province of Minas Geraes, 12 in that of Sao Paulo, 15 in the city and province of Rio Janeiro, and the rest distributed through the other provinces. The largest is the Brazil Industrial Factory, at a place called Macacos, in the province of Rio Janeiro. This factory has 800 looms, and employs 500 operatives. The capital of the company is about 1,650,000 dols. The shares are quoted at some 15 per cent. below par. The company, which is in debt, has issued debentures to the amount of 550,000 dols., on which it pays interest to the amount of 19,000 dols. every six months. Another large factory is the Petropolitana, which is also in the province of Rio Janeiro. The capital of the company is 1,000,000 dols., which it has resolved to increase to double that sum. It has recently enlarged its plant, which is now valued at over 3,500,000 dols. It has issued debentures to the amount of 1,000,000 dols., and has a floating debt of about 1,200,000 dols. Its receipts last year amounted to 184,242 dols., and its expenses to 117,806 dols., including loss by bad debts and interest on its indebtedness. The Rink Factory, in this city, in which is invested a capital of nearly 800,000 dols., employs 400 workmen, and produces an annual average of 1,300,000 yards of cotton goods, 220,000 of woollen goods, and 65,000 of felt."

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The profit-sharing system proposed by the Bourne Mills, of Fall River, Mass., has just come into effect. A circular issued to all the employées explains its provisions, and gives an idea of how profitable it may be to those who are to benefit by it. It shows that, had the system been in operation during the first six months of this year, the employées would have received a larger dividend on their wages than the average rate of dividends paid by the savings banks of Massachussets. For instance, the profits of the Bourne Mills during that time would have warranted the paying of a dividend of 2·59 dols. for six months on every 100 dols. earned, whereas the savings banks paid on an average only 2·05½ dols. on 100 dols.

## Tariff Changes and Import Duties.

### FOREIGN IMPORT DUTIES ON LINEN, HEMPEN, AND JUTE WOVEN MANUFACTURES.

The following statement, which shows the rates of Customs duty levied in each of the undermentioned countries upon the importation of linen, hempen, and jute woven manufactures from the United Kingdom, has been prepared in the Department for publication in the *Board of Trade Journal*.

NOTE.—Since the publication of the return relating to Foreign Import Duties (178/85), numerous modifications have been effected in the Customs Tariffs of various foreign countries; these modifications, in so far as regards the above-named goods, have been embodied in the following statement:—

| Tariff Classification in each Country. | Rates of Duty. | | English Equivalents. | | |
|---|---|---|---|---|---|
| | Rbls. | Cop. | £ | s. | d. |
| RUSSIA:— | | | | | |
| Linen cloths, not otherwise specified, bleached and unbleached, of flax and hemp of all kinds, with or without admixture of cotton | Funt | 0 85 | Cwt. 16 | 14 | 3 |
| Batiste and lawn of pure flax or hemp, or mixed with cotton, not dyed nor printed | ,, | 1·80 | ,, 35 | 7 | 9 |
| The same dyed, printed, or woven of different colours, also batiste and linen pocket handkerchiefs | As the material of which made, with an addition of 20 % | | | | |
| Handkerchiefs marked, embroidered, or bordered with lace | Funt | 2·40 | Cwt. 47 | 3 | 8 |
| Flax or hemp tissues, twilled, or with woven patterns, with or without admixture of cotton, such as table linen and towels of all kinds | ,, | 0·85 | ,, 16 | 14 | 3 |
| Drills of all kinds | ,, | 0·60 | ,, 11 | 15 | 11 |
| Coarse cloths of linen, hemp, or jute:— | | | | | |
| Sailcloth | ,, | 0·20 | ,, 3 | 18 | 8 |
| Ticking for mattresses, and all materials of flax, hemp, or jute, mixed or unmixed with cotton, for furniture, carpets, &c. | ,, | 0·50 | ,, 9 | 16 | 7 |
| Waxed and oil cloth and manufactures thereof, also canvas prepared for painting | ,, | 0·15 | ,, 2 | 18 | 11 |
| Hempen hose for fire engines, hempen buckets, and tarpaulin | ,, | 0·15 | ,, 2 | 18 | 11 |
| Linen and hempen hosiery not otherwise specified | ,, | 0·65 | ,, 12 | 15 | 7 |
| Galloons, braids, trimmings, &c. | ,, | 0·45 | ,, 8 | 16 | 11 |
| Buttons | ,, | 0·60 | ,, 11 | 15 | 11 |
| Lace, hand made, of all kinds | ,, | 6·60 | ,, 129 | 15 | 1 |
| Do. machine made | ,, | 3·50 | ,, 68 | 16 | 2 |
| Tulle for furniture, with patterns woven in or embroidered, and curtains of net or muslin | ,, | 1·50 | ,, 29 | 9 | 10 |
| Tulle or net, other kinds, plain or figured | ,, | 3·50 | ,, 68 | 16 | 2 |
| Bags of linen or jute, and other coarse material for bags and packing | Poud | 2·40 | ,, 1 | 3 | 8 |
| Ready-made clothing:— | | | | | |
| 1. Made up linen of all kinds, including under-linen, but exclusive of table-linen, towels, and handkerchiefs, and those coming under Art 2 | Funt | 1·80 | ,, 35 | 7 | 9 |
| 2. Made of lawn and batiste and all kinds trimmed with lace or embroidered | ,, | 2·40 | ,, 47 | 3 | 8 |
| 3. Ready-made clothes for men | ,, | 1·55 | ,, 30 | 9 | 6 |
| 4. Clothing for women, and articles of feminine attire of all kinds not otherwise specified, untrimmed | ,, | 2·70 | ,, 53 | 1 | 8 |
| 5. The same, trimmed with ribbon, velvet, silk, feathers, fur, embroidery, or lace | ,, | 4·20 | ,, 82 | 11 | 5 |
| *Note.*—Comparisons, coverlets, curtains, blinds and similar articles, hemmed or stitched, pay duty as materials of which they are made. | | | | | |

| Tariff Classification in each Country. | Rates of Duty. | | English Equivalents. |
|---|---|---|---|
| | Kron. Öre. | | £ s. d. |
| SWEDEN :— | | | |
| Linen and hemp :— | | | |
| Tissues, plain or twilled, except sateen and "atlas," without pattern, having in warp and woof in the space of a square centimetre : | | | |
| 25 threads or less | Kilog. 0·19 | Cwt. | 0 10 9 |
| 25 to 35 threads | ,, 0·35 | ,, | 0 19 9 |
| 35 to 50 ,, | ,, 0·90 | ,, | 2 10 10 |
| Above 50 ,, | ,, 1·50 | ,, | 4 4 8 |
| Sailcloth | ,, 0·19 | ,, | 0 10 9 |
| Carpets, not included above | ,, 0·40 | ,, | 1 2 7 |
| Ticks and "corset webbing" not included above | ,, 0·90 | ,, | 2 10 10 |
| Other tissues of linen and hemp | ,, 1·50 | ,, | 4 4 8 |
| Tissues of jute :— | | | |
| Unbleached or undyed | ,, 0·10 | ,, | 0 5 7½ |
| Bleached or dyed | ,, 0·40 | ,, | 1 2 7 |
| Waxed and oil cloth :— | | | |
| Floor cloth | ,, 0·25 | ,, | 0 14 1 |
| Other kinds | ,, 0·60 | ,, | 1 13 11 |
| Tapes and Ribbons | ,, 1·10 | ,, | 3 2 1 |
| Braces and belts | ,, 0·60 | ,, | 1 13 11 |
| Blinds, painted or printed | ,, 0·90 | ,, | 2 10 10 |
| Lace and blonde | ,, 2·35 | ,, | 6 12 8 |
| Fringes, galloons, cords, cording, &c. | ,, 1·10 | ,, | 3 2 1 |
| Hosiery, stockings, knitted gloves, &c. | ,, 1·18 | ,, | 3 6 7 |
| Gloves, other than knitted gloves | ,, 1·80 | ,, | 5 1 7 |
| Ready-made clothing ; sheets, towels, &c., hemmed or with needlework | As the material of which made with an addition of 20 % | | |
| Embroidered articles | As the materials upon which embroidered, with an addition of 20 % | | |
| NORWAY :— | Kron. Öre. | | |
| Manufactures of linen, hemp, or jute :— | | | |
| Fishing nets | As the material of which made, with an addition of 10 % | | |
| | Free. | | Free. |
| Engine hose | Kilog. 0·13 | Cwt. | 0 7 4 |
| Horse and furniture girths | ,, 0·27 | ,, | 0 15 3 |
| Carpets and carpeting | | | |
| Tapes and ribbons, also ribbons or tissues mixed with india-rubber or gutta-percha, and waistbands of the same | ,, 1·10 | ,, | 3 2 1 |
| Drill and damask, also handkerchiefs not otherwise specified | ,, 0·60 | ,, | 1 13 11 |
| Knitted wares, dyed or not | ,, 1·10 | ,, | 3 2 1 |
| Other tissues :— | | | |
| Close woven, bleached :— | | | |
| Weighing 110 grammes or more per half-metre square (3·90z. to 2·7 square feet) | ,, 0·07 | ,, | 0 3 11½ |
| Other kinds :— | | | |
| Unbleached | ,, 0·07 | ,, | 0 3 11½ |
| Bleached or of one colour, even if applied by printing or rolling | ,, 0·27 | ,, | 0 15 3 |
| Dyed of several colours, not printed | ,, 0·53 | ,, | 1 9 11 |
| Printed | ,, 1·10 | ,, | 3 2 1 |
| Open or transparent :— | | | |
| Blonde, bobbinet, lace and tulle | ,, 2·50 | ,, | 7 1 2 |
| Other kinds | ,, 1·76 | ,, | 4 19 4 |
| Trimmings, buttons, fringes, &c. | ,, 1.35 | ,, | 3 16 3 |
| Floor-cloth, matting, tarpaulin, and other cloth, weighing 470 grammes or more to the half metre square | ,, 0·13 | ,, | 0 7 4 |
| Oil cloth | ,, 0·67 | ,, | 1 17 10 |
| Ready-made clothing | As the material of which made, with an addition of 10 % | | |
| *Note.*—Manufactures of flax, hemp, or jute mixed with cotton, pay as cottons. | | | |
| DENMARK :— | | | |
| Linen, hempen, and jute tissues :— | | | |
| Unbleached :— | | | |
| Containing less than 24 threads to the square half-inch, or weighing 44 quints (7¾ ozs. avds.), or above to the square ell (4½ square feet) | Kron. Öre. Pund 0·04⅛ | Cwt. | 0 4 8½ |
| Other kinds | ,, 0 12½ | ,, | 0 14 1 |
| Sailcloth, tarpaulin cloth, weighing 44 quints and above to the square ell ; also druggeting (so far as such cloths are not included above) | ,, 0·12½ | ,, | 0 14 1 |
| Marly, embroidery cloth, canvas, stiff-nets and other open gummed or stiffened wares, girths, bands, and tapes, fish nets ; also lamp wicks | ,, 0·33⅓ | ,, | 1 17 8 |

| Tariff Classification in each Country. | Rates of Duty | | English Equivalents. |
|---|---|---|---|
| | Kron. Öre. | | £ s. d. |
| DENMARK—*cont.* | | | |
| Linen, hempen, and jute tissues—*cont.* | | | |
| Open and transparent tissues, combined or not with metal threads or spun glass, crotchet, lace, fringes, trimmings, and button-makers' wares | Pund 1·00 | Cwt. | 5 12 11 |
| Other kinds :— | | | |
| Printed wares, knitted wares, hosiery and velvet stuffs | ,, 0·66⅔ | ,, | 3 15 3 |
| Dyed in colours, not printed | ,, 0.50 | ,, | 2 16 6 |
| Of one colour ; also damask, drills, &c., undyed | ,, 0·41⅔ | ,, | 2 7 1 |
| Undyed plain tissues ; also wadding | ,, 0·25 | ,, | 1 8 3 |
| Ready-made clothing :— | | | |
| When not lined or trimmed, or when the lining or trimming is not liable to a higher duty than the material of which made | As the material of which chiefly composed, with an addition of 50 % | | |
| When the lining or trimming is liable to a higher duty than the material of which made | As the material of which chiefly composed, with an addition of 100 % | | |
| GERMANY :— | Mks. Pfg. | | |
| Undyed druggeting of jute or manilla hemp | 100 kilos. 12·00 | Cwt. | 0 [illegible] |
| Dyed do. do. | ,, 24·00 | ,, | 0 12 [illegible] |
| Tissues of linen, hemp, or Jute ; tickings, drills :— | | | |
| Unbleached, and not printed nor dyed ; having in the warp and woof per 4 square centimetres :— | | | |
| 40 threads or less | ,, 12·00 | ,, | 0 6 1 |
| 41 to 80 threads | ,, 24·00 | ,, | 0 12 2 |
| 81 to 120 ,, | ,, 36·00 | ,, | 0 18 3 |
| About 120 ,, | ,, 60·00 | ,, | [illegible] 6 |
| Bleached, dyed, printed, or woven of bleached, dyed, or printed yarn, having in the warp and woof per 4 square centimetres :— | | | |
| 120 threads or less | ,, 60·00 | ,, | 1 10 6 |
| Above 120 threads | ,, 120·00 | ,, | 3 0 11 |
| Damask of all kinds, table cloths, bed linen, and towelling, &c. | ,, 150·00 | ,, | 3 16 3 |
| Ribbons and tapes, edgings, fringes, gauze, imitation lace, &c. | ,, 100·00 | ,, | 2 10 10 |
| Hosiery and all articles combined with metal threads | ,, 100·00 | ,, | 2 10 10 |
| Embroidery | ,, 150·00 | ,, | 3 16 3 |
| Thread lace | ,, 800·00 | ,, | 20 6 6 |
| Oilcloth ; coarse unprinted packing cloth | ,, 12·00 | ,, | 0 6 1 |
| Waxed muslin | ,, 50·00 | ,, | 1 5 5 |
| Other kinds of oilcloth | ,, 30·00 | ,, | 0 15 3 |
| Ready-made clothing :— | | | |
| Underlinen | ,, 150.00 | ,, | 3 16 3 |
| Other kinds | ,, 300.00 | ,, | 7 12 5 |
| HOLLAND :— | | | |
| Sail-cloth | Free. | | Free. |
| All other manufactures | 5 % *ad val.* | | 5 % *ad val.* |
| Ready-made clothing | 5 % *ad val.* | | 5 % *ad val.* |
| BELGIUM :— | | | |
| Tissues of all kinds of linen, hemp, or jute :— | | | |
| Sailcloth | Free. | | Free. |
| Lace made by hand and on bobbins | Free. | | Free. |
| All other kinds | 10 % *ad val.* | | 10 % *ad val.* |
| Hosiery, haberdashery, trimmings, &c. | 10 % *ad val.* | | 10 % *ad val.* |
| Ready-made clothing | 10 % *ad val.* | | 10 % *ad val.* |

## Manufacturers and their Workpeople.

Although we find much to disagree with in the columns of the "Yorkshire Factory Times," a weekly publication which has just reached its sixth issue, still there is much in it that, to manufacturers and others engaged in the textile trades, will be found of advantage if well studied. In a leader in the fifth issue, headed "A better plan than fining weavers," there is some excellent advice given to manufacturers generally, which, if followed out, would, we are sure, bring about a much better feeling amongst employers and employed than now exists in many factories that we could name. The article in question says :—"Our attention has been called during the last few weeks to a condition of things that seems to obtain to a very large extent in the weaving industries. We refer to the question of fines for damaged pieces. As far as our judgment goes, and we admit it is a judgment formed from evidence given from one side, we have come to the conclusion that, if

there were any rebutting evidence, it would have been to the employers' interest to have produced it ere this. Lest it be thought that we desire to uphold any system of careless work, we emphatically say that for habitual carelessness, or as a preventive of the weaver turning out bad work, some system of punishment equitable to both sides—employer and employed—ought to be put into operation for the mutual protection of weaver and manufacturer. But that the weaver ought to bear the burden of every damage seems to us to be unfair, nay, let us go further, and say unjust. Through the columns of our paper, our attention has been drawn to this question, and it seems to us, no matter what the damage done, or the cause of it, the weaver is called upon to suffer. That the average weaver is not willing to bring off their looms good work rather than bad, from a long experience of weaving, we emphatically deny. And we go further, and say that every man that looks a piece of cloth over from the hands of the weaver is as fully convinced of this as we are. And yet all weavers are treated as if they could have avoided faults. The tuner and piece taker-in might be, as far as we can see, leagued together for the purpose of, through this channel, reducing the wages of those who work under them. If we are, for the sake of producing better work, to have a system of punishment, ought not all the parties concerned to stand on the same level, and, by whoever the fault has been committed, he should be the party on whose shoulders the burden should rest, whether of fine or any other punishment. We could cite case after case, which has appeared in our columns, in which the attention of all the heads of departments has been called to the piece in the loom, and the weaver has been told to proceed with the work. But directly the cloth is put over the "purk," a different aspect is thrown on it, and in some cases the weaver has been fined the whole piece wage. Conduct like this, we maintain, tends to the producing of bad work, it creates feelings of discontent, and no weavers can be successful in their efforts to produce good work, who have minds rankling with a sense of injustice and wrong doing. Nor is this the only factor that is the means of bad work being brought out of the looms. A very much more strict system of supervision by the manufacturer over the overlooking staff is needed in the mills in Yorkshire. Is not the treatment disgraceful which our wives and daughters are obliged to submit to by some men who overlook the looms in the sheds? If these men were paid for sitting on their benches the day through, we could better understand the coarse and brutal language dealt out to our women when they are asked to alter or repair a loom that is out of order. But that men paid to keep looms in working order should curse and swear at every small job they are solicited to do is a matter that needs the attention of the manufacturer himself to alter. The system of fining, if our correspondent is to be trusted, is one that has been tried for years, and must be considered a perfect failure for the purpose *said* to be desired. We have pleasure in suggesting the adoption of two ways tried by one of the largest firms of manufacturers in Yorkshire, and tried with success. This firm has for years only fined where the fault has been clearly shown to be the weaver's, and we are assured, from indisputable authority, that this is of rare occurrence indeed. Where they fine weavers who are careless of the work entrusted to them, they warn them first, and if that fails, then the looms are to let, and the weaver has to find a fresh shop. This, we contend, is one way of bringing about a better condition of weaving than by engendering a careless spirit in the minds of the workers by constantly taking away a portion of their hardly earned wages. This firm, running close upon a thousand looms, has for years seen the power of emulation, and has taken advantage of it. As a consequence, it has less returned pieces from the merchant than any other firm within a wide radius, and for superiority of goods has a world-wide reputation. Instead of constantly taking from the wage of the weaver, in the shape of fines, the practice is to pay a premium on all pieces that pass the taker-in, the amount varying in proportion to the sum paid per piece. The weavers take an interest in the work, and better work is the order of the day. These two courses commend themselves to both employer and employed. The master by stopping careless weavers protects himself, and teaches the discharged weaver a more salutary lesson than any amount of fining is likely to do, and by encouraging diligent application to work by the payment of a premium for good woven pieces, prevents a loss to himself in the shape of unsaleable goods, and commands a supply of careful weavers, where others are forced to be content with indifferent ones."

## Commercial Education in Manchester.

An interesting experiment in the direction of providing sound commercial education for the youth of Manchester is about to be tried by the School Board. The question of the provision of a commercial training for the lads and young men of large centres of industries and commerce has been long discussed. The ordinary elementary education of the Board School gives to the student a good groundwork upon which may be based the success of his after life. To many lads of a studious and industrious turn of mind the Board School alone has been a stepping stone to much after success. But the want of a special commercial, or technical curriculum, has long been felt. In Germany and France there are, as is well known, special schools for commercial training. An interesting example of this kind of school in France is the Ecole Professionnelle Municipale of Rheims. At this institution, a thorough grounding is given to the boys who have passed through the elementary schools in the city, and it is intended to help them in getting a practical knowledge of manufactures and commerce. Here, however, a step in advance of the proposals for the curriculum of the new Manchester school is taken. At Rheims, technical subjects are taught, among which are weaving, spinning, and the use of tools. Such a school would, therefore, combine the work of a commercial school and the work of an institution like a Technical School. It would have a commercial as well as a technical side. In Germany, the Fortbildung schools perform similar work, and do much to educate the pupils in commercial and manufacturing subjects. In both countries, it is generally recognised that the course of studies in the training for commercial pursuits must differ from the instruction necessary for the learned professions, or for a career of scholarship. The "continuation" schools of the Continent have performed a work which has resulted in a great improvement in the educational standard of young men and women, and the work about to be commenced in Manchester will be very much on similar lines. The question of commercial education has been receiving a considerable amount of attention recently. The Manchester Chamber of Commerce has recognised the importance of the subject, and has decided to form a committee to consider a scheme of commercial education. The London Chamber of Commerce, some time since, remarked on the importance of providing means for improved commercial training, and has also appointed a committee to draw up a scheme for the purpose of giving special encouragement to commercial subjects of instruction. The universities have not neglected the question, and Cambridge has taken the lead in acknowledging the necessity for giving it special attention. The "Commercial Evening School," as it it is called, will be a great advance upon the series of winter evening classes which have been in operation under the auspices of the Manchester School Board. It is established in the desire to help the youth of Manchester who intend to enter upon a commercial life. It will provide a complete and connected course of instruction in the subjects requisite for candidates desirous of obtaining positions of trust and responsibility in the counting house, warehouse, bank, or office, as clerks, cashiers, bookkeepers, or as general and foreign correspondents. In the prospectus, it is stated that the course of instruction in the commercial evening school will also be useful for students preparing for the Civil Service, and the accountants' and the actuaries' preliminary examinations. Another, and not the least important, object of the school is to serve as a continuation school for scholars leaving elementary and secondary day schools, in order specially to fit young people for commercial employment. The course of instruction will be of an exceedingly practical character. A junior student in the school may be instructed to answer and press copy a letter or to furnish a statement or account of sales. On the other hand, a senior pupil may have to take down, in shorthand, matter for transcription on the typewriter, or for translation into French, German, or Spanish, or to present and report upon a profit and loss account and balance sheet. In order to suit the different capacities and necessities of the pupils, it is expected that junior and senior divisions in most of the subjects will be arranged. The former division will include students under 18 years of age, but, in any case, the convenience of the pupils will be considered. The subjects to be taught are not without interest. In the first place, there is the important subject of Commercial and Civil Service writing. Under this head will come business letters, indexing, précis writing, preparation of tabular statements, and fair copying of illegible writing. Another important subject which is of growing importance is shorthand, to which much attention will be given. Then follows in the syllabus commercial arithmetic, in connection with which interest, bills, stocks, shares, weights and measures, currencies, the principles of banking, and the general application of arithmetic to commerce, will receive consideration. The subject of bookkeeping will also occupy a prominent position in the curriculum. A subject hardly less important to Manchester people, and which has only recently received the attention it deserved, is commercial geography and history. This subject will be treated in the course of a series of twenty lectures. A study will be made of the commercial history and geography of Lancashire, of Great Britain as a whole, and of our great industrial and commercial rivals—France, Germany, and the United States. The economical geography of products and their commercial history will not fail to receive attention, and the lectures will be fully illustrated by maps, plans, and diagrams, and with specimens of the materials of commerce in their raw state, in the progress of manufacture, and as finished goods. Modern languages will also be dealt with, in connection with which the students of the school will have the privilege of attending the Board's classes in French, German, and Spanish. Typewriting, so well understood and practised in the United States as a time-saving employment, will be also taught. Eight machines will be provided for this purpose. The Commercial Evening School will begin its work in September, at the Higher Grade School, Deansgate, the school being held on Mondays and Tuesdays in each week. The object of the Manchester School Board in opening such a school is, the syllabus states, to provide technical evening instruction in those subjects which meet the requirements of modern business, and, from the subjects to be taught, it seems not improbable that this laudable object will be gained. In his work upon "Industrial Education," Sir Philip Magnus states "that the organisation, in all large towns, of evening classes, with a well-arranged programme of studies, is a necessary part of any system of commercial education," and it may be said that the Manchester School Board are endeavouring to carry out this suggestion.

## Original Designs.

On our first plate is a design for Upholstery Plush. This pattern should be produced about three times its present size.

* * * * *

On our second plate, we give a design which is intended as a simple example of Ruled-Paper Draughting for Dress Goods. Some of our young subscribers have asked us repeatedly to give designs upon ruled-paper, but the space at our disposal is too small to attempt anything of an elaborate character. We, therefore, wish it to be understood that we give this design specially for the benefit of our young subscribers.

* * * * *

On our third plate will be found two illustrations of Paget's Machine for Warp Weaving and Knitting without Weft. We also give a double page Supplement of illustrations of this machine, and a long description of it on page 20.

## Monthly Trade Reports.

WOOLS.—The demand for Colonial wools during the month has been large. Staplers, spinners, and manufacturers, have generally bought largely, and stocks on hand are now considerable. Sellers both of foreign and English wools ask firm rates, and the consequence is that the demand has only been for actual requirements. The new clip of English wools has been large, and a great proportion of it is now in the hands of staplers. In yarns, spinners have been extremely busy on old orders, and as, in many cases, these will last for some little time, new orders are generally refused, unless at very firm rates. Merchants have held off from buying, hoping to induce spinners to accept lower rates, but with little success, as, in only a few instances, have lower prices been taken, and this has in a measure been owing to circumstances. The piece branches have been well employed, and there seems every prospect of a good business for some time to come. The demand for soft goods and coatings has kept up, both for home and foreign markets, and prices generally have been firm.

WOOLLEN.—There has been a greater demand for fine worsteds recently than was every experienced in the trade before, and, judging by accounts, the outlook is particularly bright for some time to come. Orders have been freely offered and firmer rates secured; as a rule, unless higher prices have been offered, orders have been refused. In the tweed and mantling branches a decided improvement has also been experienced, and especially in cloths for the ready-made clothing trade. Orders for the Spring season have been in abundance, and for some months to come manufacturers are ensured full time at their mills. In some classes of tweeds, prices, taking into account the recent rates for wool, are not very satisfactory, still, on the whole, they are such as to ensure a working profit to the producer.

LINEN.—Taking into consideration the season of the year, the linen trade may be considered satisfactory, as, with the exception of the finer classes of table and other linens, the demand has been above the average. In fancy towels and domestic cloths generally, there has been a fair demand, and the same may be said of drills of a fancy class. In bed linen, an improved business has been done, as well as in drabbets and buckrams. In the fancy branch, the new patterns will shortly be issued, and these generally are of such a character as regards designs, &c., that manufacturers are sanguine of getting good orders from them. Prices have kept moderately firm.

LACE.—The strike in the Nottingham district has not benefited the lace trade by any means, and, judging by the opinions generally expressed by manufacturers, it will end in a further removal of machines to outside districts. One effect of the strike has been to enable producers to get rid of some old stock, but as those on hand have, for some time past, been considerable, not much impression has yet been made. The demand for the various kinds of laces has only been quiet, and the prospects for the future are by no means encouraging. Competition is still keen and prices generally unremunerative.

COTTON.—The various branches of the cotton trade have kept about as last month, if there be a change, the prices of the raw material and yarns have been slightly harder, and the tendency at the close of the month seemed to be upwards. For home consumption there has only been a slow demand. Medium counts of twist and weft cops have been fairly steady, and yarns made from Egyptian cotton are about the same as last month. For export to Eastern countries, the demand has been moderate. For the Continental countries, only small orders have been given. There has been but little alteration in the cloth departments. A few fair orders have been placed for China, but to other countries in the East the markets have been decidedly slow. For home consumption, a fair demand has ruled, but, generally, much new business has been curtailed through spinners and manufacturers being firmer in their prices. The margin for profit, especially to the manufacturer, is at present very small, and, in many cases, almost *nil*, the price of the raw material and yarns being rather out of proportion to the rates procurable for cloth.

## Co-operation in Factories.

The half-yearly meeting of the shareholders of W. Thompson and Sons, Limited, was held recently in the minding room, Woodhouse Mills, Huddersfield, Mr. M. G. Thompson presiding. There was a good attendance of shareholders from various parts of the country. Mr. Thompson, in reviewing the portion of the concern, said he was more hopeful than ever of the success of the business. The events of the past six months were, he thought, satisfactory signs of such success. There were, however, a good many obstacles to be overcome, and a great many prejudices and customs to resist. One particular feature of their establishment was that all their transactions were for cash payments, and it was not pleasing to the commercial community, who were often given six or twelve months' credit, and there were houses that looked to the time given before the price of the cloth itself. He believed they had obtained the thorough confidence of co-operative societies (who are sometimes imposed upon with inferior goods), as they had begun to recognise that the firm only manufactured genuine articles. One gratifying feature of the business was that, from their ranges of patterns, they were able to sell, in some instances, seventy or eighty pieces of one kind, whilst in some mills two pieces of one sort was about all they could sell. They had heard that there was a keen competition amongst manufacturers in Bradford, Leeds, Halifax, Dewsbury, and Huddersfield, and also that the manufacturers could undersell Huddersfield manufacturers, but they never told the people that the conditions of selling were different in these districts. Some of the differences in price were made up in different ways. The custom at Bradford was to only allow fourteen days and 1½ per cent. discount, whilst, in Huddersfield, it was six months' credit and 5 per cent. discount, besides the small change being thrown off, so that when listening to people who said that they could buy Bradford woven cloth cheaper than Huddersfield cloth, they should compare customs and allowances as well as prices. Mr. Thompson strongly condemned the syndicates that were being formed all up and down as being ventures to take money from the pocket of the workers, and put more money into the pockets of the idlers. But coming to the matters chiefly affecting them as share holders, he was glad to say that they had done business with the English co-operative societies amounting to £2,117 17s. 6d., with the Scottish wholesale of £2,470, and some with other establishments, that pointed out to him that they were progressing favourably. They had been trying to keep up with the times, and had now running a new warping mill. They had got five fast looms more from Dobcross, and had also shrinking machinery such as very few firms had. The number of shareholders were 151, holding 3,993 shares. He had every confidence in the society's material progress, and, whether he lived to see it or not, he felt that the institution would have some influence in the better regulation of society. It was not to alone improve the portion of those who worked there that he tried the system of profit-sharing, but because he thought it would tend to the solving of the great social problem. The traveller, Mr. W. Howe, cotton spinner, one of the directors, and Mr. Dearnley, one of the weavers, also spoke, and after a vote of thanks to Mr. Thompson, and a good tea, the company separated, satisfied that the concern is a noble one.

## Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, July 27th, was 388. The number in the corresponding four weeks of last year was 388, showing no alteration, leaving a net decrease in 1889, to date, of 105. In addition to these gazetted failures, there were 258 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 311, showing a decrease of 53, being a net increase in 1889, to date, of 102. The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, July 27th, was 716. The number in the corresponding four weeks of last year was 901, showing a decrease of 185, being a net decrease in 1889, to date, of 1,389. The number published in Ireland for the same four weeks was 34. The number in the corresponding four weeks of last year was 43, showing a decrease of 9, being a net decrease in 1889, to date, of 58.

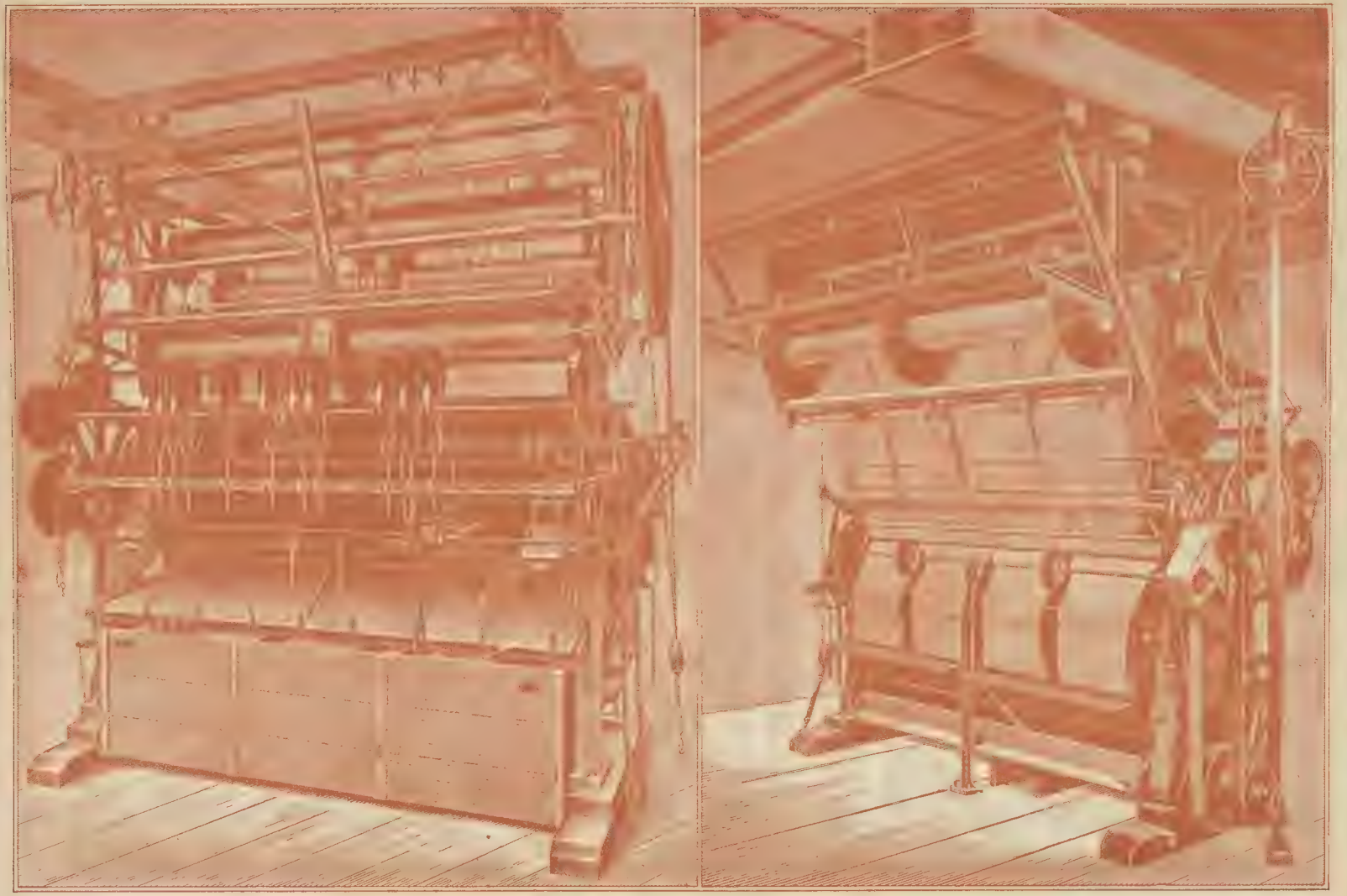
An invention of first-rate importance is announced from India. It is a mechanical process whereby the rheea fibre may be taken from the stalks when green; and the removal of the gummy matter—hitherto the chief obstacle to the proper cleaning of the fibre—can be effected in from two to three hours. M. Jules Papleux is the inventor.

12TH AUGUST, 1889.

DESIGNED BY R. T. LORD.

UPHOLSTERY PLUSH.

DRESS GOODS.



PAGET'S MACHINE FOR WARP WEAVING AND KNITTING WITHOUT WEFT.

FOR DESCRIPTION, SEE PAGE 20.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

# FASHIONABLE DESIGNS.

## Woollen Trousering.

No. 595.

Design.

Warp :—

8 ends Black, 10 skeins woollen.
5 ,, White and Blue twist, 7 skeins woollen.
1 end Red and Black ,, 10 ,, ,,
5 ends White and Brown ,, 7 ,, ,,
1 end Red and Black ,, 10 ,, ,,

20 ends in pattern.

Weft :—Black woollen, 8 skeins.

1,792 ends in warp ; 28 ends per inch ; 7's reed, 4 ends in a reed ; 54 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. 25 oz. cloth.

## Woollen Suiting.

No. 596.

Design.

Warp :—2 ends Twist, 12 skeins woollen.
2 ,, Black, 14 ,, ,,
6 ,, Brown, 14 ,, ,,
6 ,, Black, 14 ,, ,,
6 ,, Brown, 14 ,, ,,
6 ,, Black, 14 ,, ,,
6 ,, Brown, 14 ,, ,,
2 ,, Black, 14 ,, ,,

36 ends in pattern. Weft :—

2,240 ends in warp ; 35 ends per inch ; 8¾ reed, 4 ends in a reed ; 40 picks per inch ; 64 inches wide in loom ; 56 inches wide when finished. 19 oz. cloth.

2 picks Red, 14 skeins woollen.
46 ,, Black, 14 ,,

48 picks in pattern.

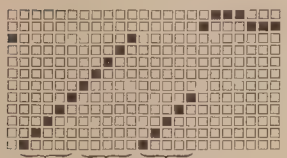
## Worsted Trouserings.

No. 597.

4 times. 4 times. 4 times.

Design.

Pegging Plan.



4 times. 4 times. 4 times.

Draft.

5,040 ends in warp.
78 ,, per inch.
13's reed, 6 ends in a reed.
64 picks per inch.
64½ inches wide in loom.
56 inches wide when finished.
15 oz. cloth.

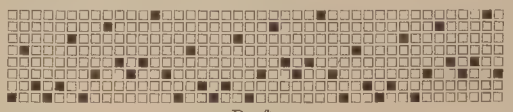
Weft :—Dark Slate, 2/26 worsted.

Warp :—16 ends Brown, 2/40's worsted.
5 ,, Twist, 2/32's ,,
20 ,, Brown, 2/40's ,,
5 ,, Twist, 2/32's ,,
16 ,, Brown, 2/40's ,,
6 ,, Dark Slate, 2/40's ,,

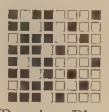
68 ends in pattern.

No. 598.

Design.



Draft.



Pegging Plan.

Warp :—
1 end Blue, 2/36's worsted.
1 ,, Black, 6's cotton.
1 ,, White, 2/36's worsted.
1 ,, Blue, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Brown, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Blue, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, White, 2/36's worsted.
1 ,, Blue, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, Black, 2/36's worsted.
1 ,, Blue, 2/36's ,,
1 ,, White, 2/36's worsted.
1 ,, Blue, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Blue, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Green, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, Brown, 2/36's worsted.

Warp continued :—
1 end Green, 2/36's worsted.
1 ,, Black, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, Black, 2/36's worsted.
1 ,, Blue silk, 40/2.
1 ,, Black, 6's cotton.
1 ,, Black, 2/36's worsted.
1 ,, Yellow silk, 40/2.
1 ,, Black, 2/36's worsted.
1 ,, Brown, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Green, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, Brown, 2/36's worsted.
1 ,, Green, 2/36's ,,
1 ,, Black, 2/36's ,,
1 ,, Black, 6's cotton.
1 ,, Black, 2/36's worsted.

42 ends in pattern.

Weft :—7's Black cotton.

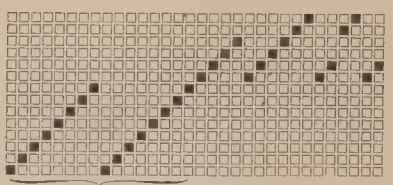
5,376 ends in warp.
84 ,, per inch.
10½ reed, 8 ends in a reed.
64 picks per inch.
64 inches in loom.
56 ,, when finished.
21 oz. cloth.

## Cotton Dress Goods.

No. 599.

Twice.

Design.



Twice.

Draft.

Pegging Plan.

Warp, 2/36's ; weft, 2/36's ; 45's sett : 50 picks per inch : 14 shafts.

# MACHINERY, &c.

## Warp Weaving and Knitting without Weft.

Since the last issue of our Journal, we have had an opportunity of seeing a very ingenious warp weaver and knitter, which has been designed by Mr. A. Paget, of the firm of Messrs. A. Paget and Co., of Loughborough. The machine is one of the leading features in the British Section of the Paris Exhibition, where it has already been viewed by large numbers of persons interested in various branches of the textile trades. On our visit to Loughborough, what was a great surprise to us was the adaptability of the machine to the production of a great variety of fabrics of the most diverse kinds, including knitted fabrics of different descriptions, cloth for ladies' and gentlemen's wear, sheets, towels, blankets, rugs, &c. We have a number of specimens on hand, which require a rather critical examination to judge whether or not they have been produced in a loom by the aid of a shuttle. The machine is also capable of automatically "shaping" articles of clothing while they are being woven, and articles of any number of equal or varying width can be produced simultaneously with a perfect selvage to each edge of every width, and with a loss of space of only $\frac{1}{16}$ in., or less, per pair of selvages. By a new arrangement, also, all "guides" are threaded simultaneously when a warp is finished and a new warp commenced, the machine being only kept standing about 20 minutes when each warp beam is finished, as against three or four hours under the old system of tying in every thread. The machine shown us is for a width of 84 ins., and the speed is 120 revolutions per minute, each revolution making one row of stitches or loops quite across, being 1,008 loops per revolution, or 120,960 loops per minute. The power of production of the machine is enormous. Thus, a machine attended by one girl can turn out in a week, of 55 hours, from 350 to 430 dozens of ladies' clouds, or 35 to 50 dozens of fringed towels, or from 50 to 100 dozens of bodies for ladies' vests, fully fashioned. On fringed goods, the girl attending the machine requires the aid of a young girl for two minutes at each fringe. The machine is also capable of producing many kinds of cloth at the rate of from 250 to 300 yards per week of 55 hours on the full width of the machine. In our September issue, we intend giving a few specimens of fabrics woven upon the machine. The following detailed particulars of the apparatus were given in a paper read before the Institution of Mechanical Engineers in Paris, by Mr. Arthur Paget, vice-president, and for the illustrations, which we give on our third separate plate, and also on a double page supplement, we are indebted to the editor of *Engineering*. There are three chief methods or principles of making fabric, or cloth, or tissue, from yarns or threads. The method best known and most used is that of ordinary weaving with a "warp" and a "weft," the warp running longitudinally in the fabric and the weft transversely. The next best known and probably the next most used is "knitting," properly so called; that is, knitting together, weaving, or interlacing, one thread, as in hand-knitted goods, such as stockings, socks, vests, drawers, and articles of underwear generally. Sometimes, in some machines, more than one thread is used in knitting, and then it is, as it were, an interweaving or interlacing of "weft-threads," knitted to and fro across the length of the fabric, without any "warp-threads" running longitudinally. The least known, and probably, hitherto, the least used system of weaving is what is known as "warp-weaving" or knitting. This system is the weaving together, or interlacing, or knitting together of a number of "warp-threads," woven or knitted together along the length of the fabric, without the use of any weft running transversely. Of course, in ordinary woven fabrics, the fabrics are woven of a certain width in parallel lengths, and the fabric has afterwards to be cut and shaped into articles of clothing, or whatever shaped articles may be required. Hitherto, the only method known of making fabrics which are shaped in weaving them, for articles of clothing and the like, has been by "knitting;" and the fabrics are then shaped (or "fashioned" as it is called in the trade) by methods fully explained in a paper read by the writer at the meeting of this Institution at Nottingham in 1870, and published in the Proceedings for that year (page 127). In the present paper it will be shown that such shaped goods can now be made by warp-weaving or knitting; and a machine which effects this is the special subject of this paper. In this machine, the threads are manipulated, or woven, or interlaced, by the immediate touch or action of three parts, which for convenience are called the three primary parts. These are—the troughs A, shown in Figs. 1 to 5; the needles B, shown in Figs. 6 and 7; and the hooks C, shown in Figs. 8 and 9. There is one of each of these three primary parts to each thread in the width of the fabric to be woven, and at least one additional needle. Thus, if the loom is weaving 1000 threads, then for weaving the simplest and most usual fabric there will be 1000 troughs, 1001 needles, and 1000 hooks. All the warp threads to be woven are ordinarily wound upon a weaver's beam, in the usual manner of preparing a warp for an ordinary loom, and the beam is hung upon an axle in bearings above the warp-weaving machine; or, in some cases, as will be described later on, the threads are taken directly from the cops, spools, cones, or bobbins, on which the yarn is delivered by the spinner. Each thread of the warp is led downwards from the beam, and is passed into and through a trough. In Figs. 10 to 14, these primary parts are shown in five positions in their cycle. Each trough when at rest is equidistant between the stems of the needles on each side of it, and so that the lowest part of the lips of the lower orifices of the row of troughs are just (and only just) above the tops of the stems of the row of needles. Thus it will be seen that, when the row of troughs is moved sideways (say to the left), over and across the row of needles, Fig. 10, exactly as far as the distance between ths centres of contiguous needles, each thread will be laid across and over the stem of one needle. The needles then move backwards or retire, Fig. 11, so far that the point of the beard of each needle passes over the thread laid upon its stem. The beard of each needle is then pressed into the eye of the needle, Fig. 12, by a presser (which will be shortly described), while the point of the beard of each needle passes into and safely through the loop of the fabric, Fig. 13, which is on the stems of the needles in front of the hooks. Then the needle retires further, so that its head passes a certain distance beyond the face or front of the row of hooks. Thus a certain length of thread is pulled by each needle against the face of each hook, and through each trough from the beam of warp, and through the loop of the fabric which was on the stems of the needles, and which is drawn over the heads of the needles by the hooks. While the heads of the needles are behind the troughs, the troughs are again moved sideways (this time to the right) into their former position. The row of hooks is then made to descend, so that the underside of the bend at the top of each hook just presses on each thread; and then the needles are made to advance and the hooks to descend simultaneously, Fig. 14, so that the loops already pulled by the needles are held down by the hooks, while the row of needles continues to advance to their former position. This completes the cycle. Now if, during the next revolution of the main shaft, the row of troughs were made to pass again over the needles (this time to the left) and then back to their first position as before described, then each needle in the machine would make each thread into a chain, by drawing one loop of each thread through the previously made loop of the same thread, and thus a machine with 1000 needles would make a set of 1000 chains (one chain made of each thread in the machine), but as each chain would be quite independent of the contiguous chain on each side of it, the machine would not make a woven fabric, cloth, or tissue. But if, after the row of troughs has been made to move one needle to the left, so as to lay the threads over the needles as before described, they are made to move again in the same direction to the extent of one needle more before the needles again come forward to receive a fresh row of loops, then each thread will be passed under the needle next to the left of the needle on which the last loop was formed. Then if the row of troughs be made to move one needle back (to the right), each thread will form a loop on the needle next to the left of the needle on which the first loop was formed. Then if, before the needles again come forward to receive a fresh row of loops, the row of troughs be again moved to the right, each thread will be passed under the needle upon which the first loop was made, ready to form a loop upon it again. Thus each thread forms a loop, first on one needle, then on the one next to it, then back again on the first, and so on. Thus a woven fabric is formed. In goods made with stripes of different coloured threads, the alternations of a certain number of movements of the troughs to the right, and then a certain number to the left, may be made to produce a number of stripes, either straight or in various kinds of zigzags. To vary the closeness of the weaving, it is only necessary that the distances to which the row of needles and the row of hooks retire should be varied, thus longer or shorter hooks will be pulled by the needles and held by the hooks, and so a more or less closely woven cloth or fabric will be produced. Of course, in an ordinary loom with a warp and a weft, if the closeness of the weaving, or the closeness with which the threads of the weft are laid, were to be altered, the fabric would be woven more or less open, but the width of the fabric would not be appreciably altered. But warp-woven fabrics have a different property or nature, so that, if the machine is weaving a fabric of a certain yarn on a certain number of needles with a certain closeness of weaving (that is with a certain length of loops), and if the machine be then altered so as to draw slightly longer loops and weave the fabric slightly more open, then the width of the fabric made by the machine is at once materially increased. It is by using this property of the warp woven fabrics that this machine has been made so as to be able, when desired, to shape the fabrics while they are being woven, that is, to increase or diminish their width while they are being woven. We will first follow the movements of the row of troughs, and explain how these are effected. Each trough A is attached to the trough bar A1, Fig. 36, by being driven into a suitable groove, and the walls of the grooves are then partly bent over and partly rivetted over, so as to secure the troughs to the trough bar; the trough bar is bolted to the trough slide bar A2, and this, as it were, hangs on and slides to and fro upon the V-shaped part of the main bar E. The trough bars are adjusted by the screws A3, Figs. 15 and 16, so that the lower lips or orifices of the troughs will just pass over the stems of the needles, as close to them as possible, so as not to touch them, but to allow only sufficient room for the threads to pass between the troughs and the needles. On the back of the trough slide bar A2, Figs. 17 and 18, there is a toothed rack A4, into which gears the small segment of a wheel A5, attached to the spindle or shaft A6; to the top of the spindle is attached the segment of a ratchet wheel A7, at the left side of which are ratchet teeth A8, while at the right side are ratchet teeth A9, so made as


FIG 10


FIG. 11


FIG. 12


FIG 13


FIG 14

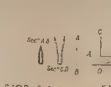

FIGS 3 & 4


FIG 1

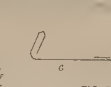


FIG. 5


FIG. 8

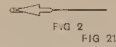


FIG 2

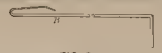


FIG 21


FIG 6


FIG 7


FIG. 9


FIG 36

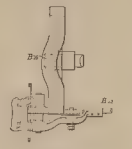


FIG 31

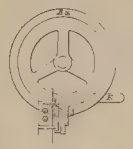


FIG 30

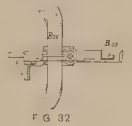


FIG 32

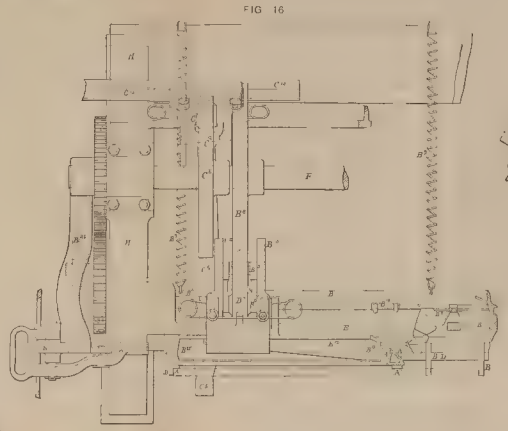


FIG 16

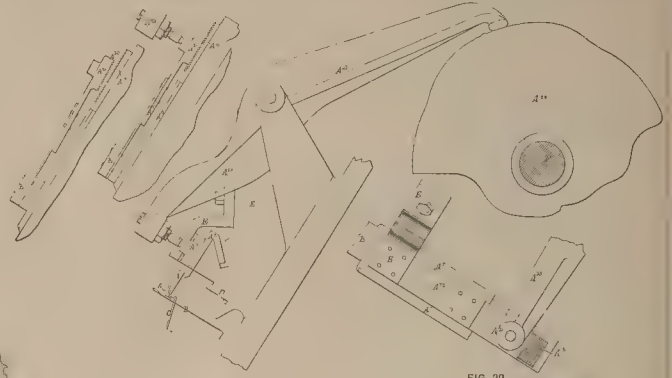


FIG 20


FIG 19


FIG. 22

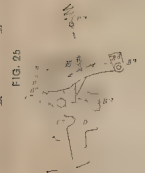


FIG. 25

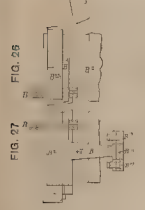


FIG. 26


FIG. 27

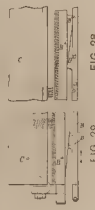


FIG. 28


FIG 29

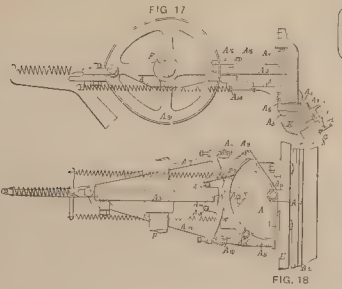


FIG. 17


FIG. 18

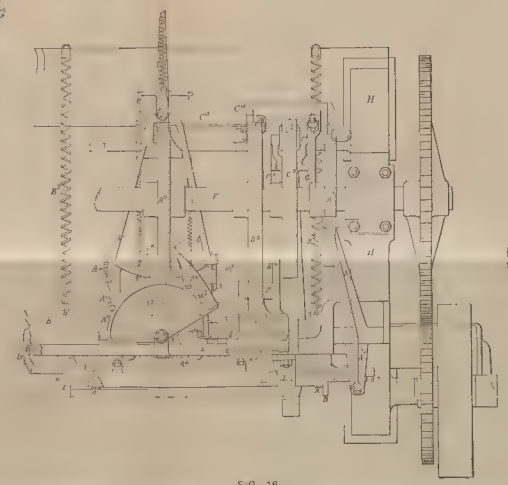


FIG 16

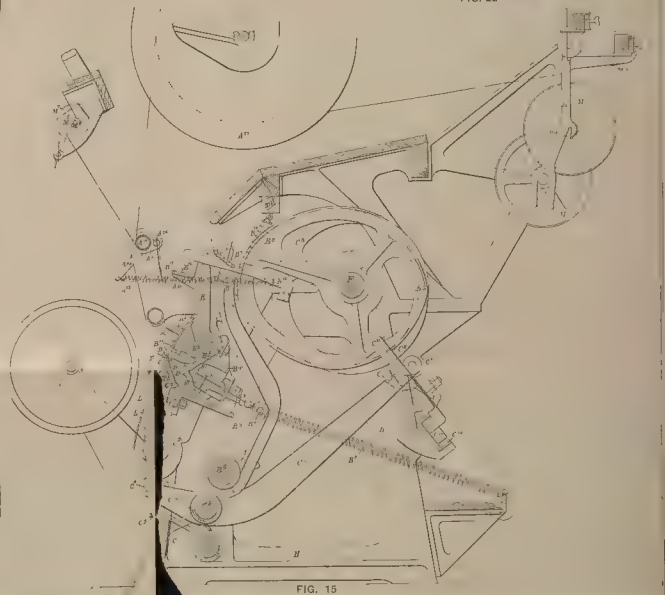


FIG. 15

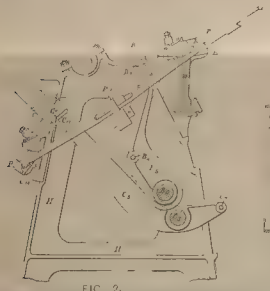


FIG 2.

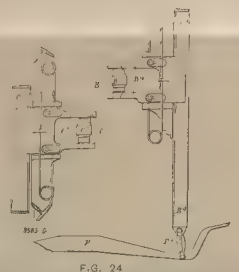


FIG. 24

PAGET'S MACHINE FOR WARP WEAVING AND KNITTING WITHOUT WEFT.

FOR DESCRIPTION, SEE PAGE 20.

immediate touch or action of three parts, which for convenience are called the three primary parts. These are—the troughs A, shown in Figs. 1 to 5; the needles B, shown in Figs. 6 and 7; and the hooks C, shown in Figs. 8 and 9. There is one of each of these three primary parts to each thread in the width of the fabric to be woven, and at least one additional needle. Thus, if the loom is weaving 1000 threads, then for weaving the simplest and most usual fabric there will be 1000 troughs, 1001 needles, and 1000 hooks. All the warp threads to be woven are ordinarily wound upon a weaver's beam, in the usual manner of preparing a warp for an ordinary loom, and the beam is hung upon an axle in bearings above the warp-weaving machine; or, in some cases, as will be described later on, the threads are taken directly from the cops, spools, cones, or bobbins, on which the yarn is delivered by the spinner. Each thread of

the walls of the grooves are then partly bent over and partly rivetted over, so as to secure the troughs to the trough bar; the trough bar is bolted to the trough slide bar A2, and this, as it were, hangs on and slides to and fro upon the V-shaped part of the main bar E. The trough bars are adjusted by the screws A3, Figs. 15 and 16, so that the lower lips or orifices of the troughs will just pass over the stems of the needles, as close to them as possible, so as not to touch them, but to allow only sufficient room for the threads to pass between the troughs and the needles. On the back of the trough slide bar A2, Figs. 17 and 18, there is a toothed rack A4, into which gears the small segment of a wheel A5, attached to the spindle or shaft A6; to the top of the spindle is attached the segment of a ratchet wheel A7, at the left side of which are ratchet teeth A8, while at the right side are ratchet teeth A9, so made as

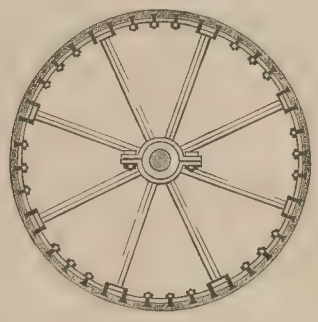
to act contrariwise to the teeth at the left side; the pitches and arrangements of these ratchet teeth on the wheel A7 and the wheel A5 and the rack A4 are such that, when the ratchet segment is moved one tooth to the right, the trough bar is moved one needle to the left and *vice versa*. Two chisel-shaped ratchets A10 and A11 are attached to the triangular ratchet frame A12, so that, according to the position sideways of the ratchet frame, either, but not both, of the ratchets (when the triangular frame is moved to and from the main shaft F by the cam A31) will act upon the ratchet teeth, and will move the trough-bar either one needle to the right or one needle to the left, in accordance with the position sideways in which the ratchets are held. There is a wedge-shaped spring latch A13 acting upon a wedge-shaped projection A14 on the ratchet frame, which will allow it to be moved either to the right or to the left, so as to put into action either the right or the left ratchet, and then to keep in action whichever is put into action, until the ratchet frame is moved sideways. To the upper surface of the ratchet segment A7, at the left side, there is attached an inclined finger A15, and another similar finger A16 is attached in a similar way to the right side, and these fingers can be adjusted at such a distance from each other that, when the left ratchet has moved the ratchet segment, say two teeth to the left, then, as the ratchet frame is moved backwards towards the main shaft, the projection A17 on the ratchet frame will come in contact with the inclined finger, and will move the ratchet frame to the right, so that the left ratchet will be put out of action and the right ratchet will come into action, and then, when the ratchet segment has been moved two teeth to the right, the finger will act upon the projection A18, and in a similar manner will move the ratchet frame to the left; and so on. Thus the trough bar and troughs will be moved two needles to the right for one revolution of the mainshaft, and then two needles to the left for the next revolution of the mainshaft; and so on. It is, of course, absolutely necessary that, at the end of each traverse of the trough bar, each trough should stop and remain at the exact centre of one of the spaces between the needles, and this is effected in the following manner. On the front face of the right-hand end of the trough slide bar A2, Figs. 20 and 21, there is formed a row of wedge-shaped teeth A19, of the same pitch as the needles of the machine; and facing these, a similar set of wedge-shaped teeth A20 are formed on a bar A21, which is hinged by a spring hinge at its end A22 to a projection E1 on the main bar E. When the trough slide bar is completing its traverse, the set of teeth on the hinged bar A21 are pressed towards and against the set of teeth of A19 on the trough slide bar A2, and the two sets of teeth are so arranged that, when they are engaged and pressed together, the trough slide bar must take and keep its exact longitudinal position. The hinged bar is moved to and from the trough slide bar by the lever A23, Figs. 19 and 22, which is actuated at the right times by the cam A24. There is a further apparatus attached to the machine for enabling the zigzag stripes before mentioned to be made by controlling the movements of the ratchet frame and the trough bar to the left and to the right in certain fixed varying orders; but the description of it would unduly lengthen this paper, and anyone wishing can see it and have it explained on the machine in the Exhibition, in the British Section of the Machinery Hall. We will now follow the movements of the needles B, and explain how these are effected. The needles are held at their back ends by hinged plates B2, which press them into grooves and holes in the needle bar B1, Figs. 15 and 16; this bar is held at the back by two joints B3, which are attached by two joint pins B4 to the two arms B5 of the rocking shaft B6; the ends of the shaft are free to oscillate in a rotating fashion in bearings in the end frames or legs H of the machine. The upper ends of the two rocking shaft arms B5 carry two bowls or trucks B7, each of which is pushed away from the main shaft F by a cam B8; and the bowls are drawn towards the shaft by the springs B9, which pull the needle bar B1 backwards. Thus by acting through the joints B3 and the rocking shaft arms B5, these springs keep the bowls B7 always pulling towards the main shaft F; and the extent of the movement of the bowls towards the main shaft F, and of the consequent backward movement of the needle bar B1 and needles B, is controlled by two double needle-controlling hooks or stops B10, which take hold of or stop the four projections B11, two on each rocking shaft arm B5. The positions of these two double needle-controlling hooks B10 are controlled by the action of the two wedges B12, which are attached to the bar B13 that slides longitudinally in suitable slides or bearings attached to the machine. Thus it will be seen that, by sliding the bar B13 and its wedges B12 to and fro longitudinally, the distance of the backward movement of the needles is easily controlled. The front ends of the needles rest upon and slide on the grooved top of the knocking-over bar D, which is held at each end by the legs or framings H of the machine. We will now follow the movements of the presser B14, and explain how these are effected. When the needles have moved backwards so far that the points of their beards are safely over the threads laid upon the stems of the needles, then the presser B14 is caused to descend, so that its rounded lower edge B15 presses upon the beards, Fig. 12, and holds their points down in the eyes of the needles, until the points of the beards are safely entered into and have passed through the loops last made of the fabric. The presser then ascends, so as not to touch the needles or their beards, and it remains in this raised position until the needles have come forward, and the troughs are again about to traverse across the needle stems. Now it is evident that, if a needle should be slightly strained and raised, so that it does not rest upon the bottom of its groove in the knocking-over bar D, the trough which has to traverse over this needle might push the needle stem to one side and break the needle, and possibly also the trough. In order to prevent this, before the troughs traverse over the needle stems, the presssr B14 is made to descend and press all the needle stems down against the bottom of the grooves in the knocking-over bar D, Fig. 10, so that then all the troughs can safely traverse over all the needles, and when they have done so, the pressser then ascends again, so as to be clear above the needle beards until they have again retired to the right position for being pressed. The presser B14 has six arms B17, which project backwards and under the main bar E, Figs. 15 and 16, and are hinged by pivots B18 to brackets B19, which are attached to the back of the main bar E. Springs B20 attached at the lower end to the arms B17, and at the top end to a suitable bar T, tend always to lift the presser upwards. On the top of the presser B14 are found some wedge-shaped surfaces B21, Figs. 25 to 29, and acting upon these are other wedge-shaped surfaces B22, formed on the bar or rod B23, the upper surface of which rests and slides against the under surface of the main bar E. If this bar B23 is traversed endways in the direction of the arrow B24, it will readily be seen that, by the combined action of the two sets of wedges, the presser B14 will be made to descend; whereas, if the bar B23 is made to traverse in the direction of the arrow B25, the presser will be caused to ascend by the springs B20. The traversing to and fro of the bar or rod B23 is affected by the cam B26 acting upon the two bowls which are shown at the end of the bar B23 in Fig. 16 and Figs. 30 to 32. It will be seen that the wedges which actuate the presser B14 have a strong tendency to bend or curve the main bar E upwards between its two ends, where it is secured to the main framing H of the machine. The presser also has a strong tendency to force downwards and to curve downwards in a similar manner the knocking-over bar D; for, although the power required to press the beard of one needle into its eye is small, the power required to press the beards of the whole 1,008 needles into their eyes is very large. If the combined curvature of these two bars were to amount in the middle of the width of the machine to as much as $\frac{1}{10}$ in. (that is, $\frac{1}{1008}$ in. for each bar), this would be sufficient to make the difference between pressing the beards thoroughly and properly, and entirely failing to press them. It is necessary, therefore, in order to enable a machine of this class to make cloth in one width (of 7 feet as in this machine), that the bar E and the bar D, should be held together very firmly and very strongly, without in any way interfering with the continuity of the row of needles A. It will be seen by reference to Figs. 15 and 36, that this is effected by the connectors N, which are made of steel plate, of the shape shown, each being thin enough to pass easily between any two needles in the row. The upper ends of these connectors N, hook into a groove E2, in the main bar E, and are held there by the piece of brass E3 and by solder. The hook at the lower end of the connector N hooks into a groove D1 in the knocking-over bar D. It will thus be seen that, in order to hold together with great firmness and rigidity the main bar E and the knocking-over bar D, and to prevent these two bars from being sprung apart, and thus to insure the accurate and perfect pressing of all the row of needles B, it is only necessary to insert a sufficent number of these connectors N between the needles, at convenient distances apart across the whole width of the machine.

*(To be continued).*

## Improvements in Cylinders, Breast Doffers, &c., of Carding Machinery.

In the woollen and worsteds trades, it is a well known fact that perfect accuracy in concentricity is requisite in the carding operations, and, during recent years, to obtain this, cast-iron cylinders have been in general use, the surfaces of which are turned and ground as correctly as possible, still, in many cases, wooden cylinders are often preferred. The reason why wooden cylinders have been approved of by the foremen and carding masters in woollen, worsted and flax mills, is chiefly on account of the great facilities that these surfaces offer in case of an accident arising with the card clothing, either through carelessness of the girls feeding, or through some hard substance in the wool or other material being fed into the carding engine. These accidents and misfortunes occur very frequently to woollen, worsted, &c., cards, and during the use of shoddies, mungo, and like materials. When such accidents arise, the card wire, sheet or fillett, on the wooden surface, is readily repaired, the workman being able to place a tack in any part, and to fasten down the torn card, or even to replace the damaged part by a new piece. These are the only advantages given for the adoption of all such wooden mechanisms, but there are many greater disadvantages in those made entirely of wood. It is almost impossible to make all wood withstand the variations in temperature arising from various causes, such as damp floors, hot and dry atmosphere, &c., which affect, and always will, the most perfectly seasoned wooden cylinders, and it is a well known fact that there is the greatest difficulty in obtaining timber old and well enough seasoned to withstand these influences, as it takes years of seasoning even to get into serviceable condition. Wooden "lags" or "segments," cylinders, &c., warp and get out of truth, and experience has proved that it is a very difficult matter to keep them in condition, even by taking off all the cards, turning and re-nailing them, whilst, in many cases, the cards are spoiled entirely by having half the card wire ground away and wasted. Cast-iron cylinders, up to the present, have been the most reliable, and can be kept in perfect condition so far as truth and concentricity are concerned, and by far the best and finest carding can be

produced with iron cylinders, doffers, breasts, &c., but the objection raised by some against their use is on account of the many various probabilities of accidents through negligence. These cylinders, &c., are also very easily broken and cracked, the only remedy in such cases being the expense of replacing them by entirely new ones. Again, cast-iron cylinders are necessarily very heavy so as to ensure strength. In order to combine the great advantages resulting from these mechanisms being composed of iron, with those claimed to be derived from the use of wood, and at the same time to ensure their being absolutely true, perfect, light, and unbreakable, and not affected by damp or heat, Mr. Roger Tatham, of the well known firm of Messrs. John Tatham and Sons, Limited, Rochdale, whose practical knowledge of these matters, and long varied experience, may be relied upon, has introduced cylinders, doffers, breasts, fancies, &c., made entirely of light wrought-iron or steel, with wrought-iron or steel arms, similar to the large drums used for driving or transmitting motive power. Outside the periphery, or circle, are placed, screwed and fastened, wooden lags or strips as thick as necessary for holding tacks to fasten the card clothing, and to allow for trueing up at the mills. These wooden strips are bolted through and fastened inside the wrought-iron, and being, by machinery, planed to the exact circle of the cylinder, fitted and bedded at every part of the surface, and the covering being much smaller or thinner (but of sufficient thickness) to turn up, they are very light, serviceable, and



strong, and the wooden strips being fitted and bedded entirely on the whole length of their surface, and screwed down, are kept in perfect order. With this excellent arrangement, the carding masters and overlookers have now that for which they have been wishing for many years, viz., good iron cylinders, doffers, breasts, &c., coupled with the great advantage of possessing ordinary wooden cylinders, doffers, breasts, &c., without the disadvantages, which are many in all wooden cylinders, doffers, fancies. breasts, &c. For abroad, *i.e.*, for foreign and outside countries, the advantages are paramount, as all risks of breakages and cracked cylinders, which often occur in cast-iron cylinders, doffers, &c., are avoided, and wooden cylinders, doffers, breasts, &c., travelling by sea, get out of truth and warp, and have, in many cases, to be run for a long time, before the proprietor dare risk putting on the expensive card clothing. These defects in the present improvements are entirely overcome, and should any damage arise to any strip or lag, by simply unscrewing the strip or lag which is damaged, another lag can be fixed in their place in a few minutes. The advantages of the improvement will be readily seen, and we may say that they are exceedingly light, and require very little power for driving. Messrs. J. Tatham and Sons, Limited, will be pleased to give further information, and will grant licenses to make and use the improvements.

## Silk Printing.

Silk printing upon machines is a branch of textile manufacture which is rapidly developing. The first experiments in this direction were made at Lyons, but, on account of the styles then popular, were not successful, for the main condition for success was lacking—considerable orders for a single design. Who would have dared to print fifteen or twenty pieces of silk with the same pattern, even under favourable conditions? The introduction of cheap mixed goods containing silk changed this at once. Goods are now made with a silk warp and cotton filling of such good quality, and containing so little silk, that goods of pure silk are being driven out, and there is nothing to prevent putting part silk goods in the hands of the poorer classes. Sometimes these goods have so little silk in them that it only brightens the cotton; they take a beautiful brilliant finish, and have a most attractive appearance. The colours applied to these goods are, as a rule, very fast: the reds and pinks are alizarine. It is important to employ colours which give equal depth, simultaneously, upon silk and cotton. It would be impossible to use eosine for pinks, as it dyes silk without being fixed upon cotton. In general, colours dye more easily upon silk than upon cotton. To get rid of this difficulty, the mixed goods can be passed first through tannin, and then through tartar emetic, to render the cotton more capable of absorbing the colours. This process has not been generally introduced however, as silk passed through tannin dyes with more difficulty than does pure silk, and the colourist has a wide choice among colours which will answer his purpose. The first part of the process with the mixed goods is the bleaching. Cotton which has been lightly bleached is always used in making these goods, so that a strong soap boil is sufficient for the bleaching. A box is used which contains sixty to seventy-five gallons of water, and for every five pieces (about one hundred and ten yards each) eleven pounds of white soap, and two and a half pounds of soda crystals are used. The bath is kept boiling, and the goods passed through from eight to ten times, and then washed with pure water. This can be done in any machine, if the goods are kept well spread, otherwise, they will have pleats and lines, which cannot be removed. After washing five pieces, renew the bath. The washed material is then mordanted.—*Journal de Teinture.*

## A New Loom Picker.

The following remarks upon a recently patented loom picker are taken from *Wade's Fibre and Fabric*. The inventor of this picker recognising in leather the proper substance out of which to make a picker has, by simply turning the edge of the leather to the shuttle, given us a picker which combines elasticity with durability, and being so constructed that it cannot tear out on either side, it will drive a shuttle as straight and true when nearly worn out as when it is first put on. In the accompanying drawings, Fig. 1 is a front view, and Fig. 2 is a side view of the improved picker. Three strips of leather a, a', a'', are placed side by side to form the body of the picker, and are secured together by rivets $a^3$, $a^4$, and $a^5$, passed through the same below the middle of the length thereof, and a rivet $a^6$ passed through near the upper end of the body. These rivets may be disposed of in any suitable manner, and any number thereof found sufficient may be employed at opposite ends of the picker body, it being necessary only that a portion of the body of the picker adjacent to the striking-point be left free from fastenings of this kind. b, b', are re-enforcing pieces, shorter than the pieces a, a', a'', and placed on opposite sides of the said pieces adjacent to the striking-point, the pieces b, b', being secured in place by rivets B. B., passing through the body of the picker at points equi-distant above and below the striking-point. $B^2$ is an indentation made for the reception of the shuttle-tip. $B^3$ is a recess for the reception of the loop which binds the picker to the picker-staff. The picker is secured upon the picker-staff with the edges of the strips in position to receive the contact with the shuttle-tip. The wear from the impact of the shuttle-tip at first will be upon the strip a' until the latter is worn away sufficiently to permit contact with the side strips a, a''. Thereafter, each time the shuttle-tip strikes against the picker, the side strips give way laterally, the elastic nature of the material of such strips causing them to straighten again when the shuttle has come to rest in the shuttle-box. or has left the box in its flight across the loom. In this manner, the shock occasioned by the contact of the picker with the shuttle is lessened, and danger of the cop being stripped from the shuttle-spindle is diminished.

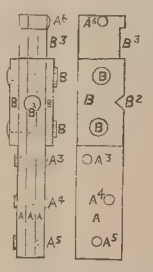


Fig. 1. Fig. 2.

## New Way to Make Tapestries.

A dealer in carpets in America, well known in the trade and of an inventive turn of mind, is at work on a new kind of tapestry, or. perhaps, rather a new way of making tapestries. He makes the face and the back separately, the face or pile surface being first woven in yarn of one colour, the colour intended for the ground. The pattern is then printed on this cloth with the advantage claimed that the printing can be done to exactly produce a Brussels effect, because the outline of the figures can be made as sharp and well defined as in Brussels, owing to the fact that the colour will not spread as when printed on yarn in the present tapestries. After the pattern is printed on the cloth, it is attached to a back made of the same materials as the present tapestry backs, and which has also been woven separately. The pattern cloth is plaited on to the back, and fastened to the latter by fine sewing between the plaits which form the pile, and these plaits can be graduated in their closeness to compare with the different number of wires used in the different grades of tapestries The special advantages claimed by the inventor are ability to test the success of a pattern by making a yard instead of having to make a print of several pieces before discovering whether the pattern comes out successfully or not, as is necessary in making tapestries under the present method; the production of all the effects of Brussels without weaving the yarn through the back; the greater durability of the fabric, and primarily the lessened cost of manufacture, and consequent ability to sell at less than the regular tapestries. The pile is made of regular worsted carpet yarn, and the inventor has gone as far as to be able to show different samples. From what the writer was shown, it is evident that the goods can be made to look like tapestry fabric. but it is presumable that the difficulties to surmount would be to get up machinery to make the goods at a price less than the regular tapestries, making the pile elastic, so that it would not mat down nor flatten out and have the appearance of cloth or felt, and to sew the plaits close enough to hide the stitching. The inventor hopes to be able to show the goods in the desired perfection by the end of this year.

The French silk manufacturers are trying to bring silk vests for gentlemen somewhat into fashion again. The gorgeous silk dresses of gentlemen in the olden time are rarely seen now a-days, excepting in museums and when special exhibits are made, as they are very often at South Kensington, when the ambassadorial and other costumes of ancestors are freely lent. Among the stuffs most numerously exhibited at the Paris Exposition are dark vestings with silk grounds—piqué, crape and armure; and black, iron gray and blue gray, spot and flower patterns, and also the same patterns in silk velvet.

## The Pushing of German Trade Abroad.

A movement, the inception of which is due to the Berlin Merchants' Association, is on foot with the object of removing a deficiency which has hitherto existed in German trade abroad. It refers to the formation of a society for furthering the sending out and establishment in foreign countries of Germans, connected with commerce or industry, who, by their technical and linguistic attainments, will afford some guarantee that they will be of service in advancing the interests of German trade and industry in foreign lands. The project is regarded with much favour by the Berlin Merchants' Association, as it is believed that its execution would give a considerable impetus to the sale of German manufactures and productions in foreign countries. As the Chambers of Commerce are, likewise, friendly to the enterprise, there can no longer be any doubt as to its being carried out. In order to give our readers some idea of the usefulness of such an institution, it is only necessary to refer to the success of a similar one which has been in existence in France since 1884. The results attained by the Société d' encouragement pour le commerce français d' exportation are calculated to excite the emulation of the commercial and industrial world. From July 10, 1884, to June 30, 1885, this society took under its protection 256 persons going abroad for trade or industrial purposes. These persons settled in all parts of the world. A commercial academy, the Ecole des Hautes Etudes, has, further, been in existence in France for about ten years, and this also can look back upon a useful activity in the interest of French foreign trade. In the annual report of this institution it is stated that it is no longer the *declasse* and poor who go abroad, but well instructed young people, who do so in order to become acquainted with the world, to seek their livelihood, and by the exertion of all their powers to become useful to their native land. This movement proceeds from Commercial Schools and Associations. Its pupils are found in Senegal, French Guiana, Canada, Brazil, Costa Rica, Uruguay, La Plata, Algeria, and in all parts of Europe. The Institut Superieur de Commerce of Antwerp, which has been established since 1862, sends pupils abroad who are supported by contributions from the Government and private individuals, the allowances often amounting to five or six thousand francs These young people have been sent out to Mexico, India, and North and South America, some have remained in those countries as consuls or merchants, while others have returned to Belgium, where they have turned to advantage the business relations formed and the experience gained abroad. With but few exceptions, all have succeeded, and have contributed to enlarge the Belgian industry by the creation of new outlets abroad. Similar enterprises exist in Austria for the establishment of travelling stipends, to which the Emperor Francis Joseph contributes. The system now projected here for sending young commercial men abroad seems to have attained its greatest perfection in France. In that country there are different commercial schools, which assist their pupils after the latter have finished their studies, so that they may carry operations abroad in the interest of French industry. Such a commercial school, disposing of ample means, is maintained by the Paris Chamber of Commerce, and there are similar institutions in Rouen, Havre, Lyons and Marseilles, which are largely assisted by the State through the establishments of grants to pupils to enable them to go abroad. The power of awarding these grants rests exclusively with the Chambers of Commerce and Industry, which have, at the same time, the supreme control of the commercial schools. Two hundred travelling scholarships are granted by the French Government every year, the total value being 400,000 francs, and, in addition, large sums are devoted to the promotion and development of technical and commercial instruction. At the same time, France possesses Chambers of Commerce in foreign countries, which undoubtedly serve to promote the interests and trade of that country.

## Modifications in Customs Tariff.

*Note.*—Arshine = 28 inches. Vershok = 1¾ inch. Poud = 36 lbs. avoirdupois. Funt = ·902 lbs. Gold rouble = 3s. 2d.

Russia.—A despatch has been received at the Foreign Office from Mr. Audley C. Gosling, Her Majesty's Chargé d'Affaires at St. Petersburg, transmitting a statement notifying several alterations in the Russian Customs Tariff, which, however, with the exception of those relating to sections 45, 46, 153, and 26, point 7, do not come into force until January 1st (13th), 1890. The following are the alterations in question:—Section 25, point 1, and section 90 of the tariff to be modified as follows:—Section 25, point 1. (*a*) Rags of every kind, except woollen and paper shreds.—Duty free. (*b*) Woollen rags, as also woollen shreds, not being patterns (section 42) of a length not exceeding 1 arshine, and a breadth not exceeding 1 vershok.—Duty, 1 rouble gold per poud. *Note.*—If on examination of the bales of woollen rags and shreds, woollen cuttings and shearings be found exceeding the dimensions specified in point *b*, the whole parcel shall then be cleared under section 206.—Duty 5·20 r. per poud. Section 90. Wool and down of every kind:—1. Raw, washed and unwashed, not dyed, as also wool combings not dyed.—Duty, 2 r. gold per poud. 2. Wool, not spun, of every kind, as also artificial wool (shoddy, mungo, and ground wool), cloth shearings of all kinds, and woollen combings dyed.—Duty, 3 r. gold per poud. 3. Wool combed in strips. (*a*) not dyed.—Duty, 4·50 r. gold per poud. (*b*) Dyed.—Duty, 6 r. gold per poud. 4. Wool yarn of every kind, pure or mixed with cotton, flax, and hemp, not twisted. (*a*) Not dyed.—Duty, 9 r. gold per poud. (*b*) Dyed.—Duty, 10·50 r. gold per poud. 5. Wool of every kind twisted or woven in two threads or more. (*a*) Not dyed.—Duty, 10·50 r. gold per poud. (*b*) Dyed.—Duty, 12 r. gold per poud. *Note.*—Woollen yarn, containing a mixture of silk, shall pay 20 per cent. in addition to the duty fixed under this section for woollen yarn without such admixture.

The *Deutsche Handels-Archiv* says that, according to an official communication, the Russian Customs Tariff has been modified as follows:—Category 196.—Tissues, cloths, and ribbons of pure silk, &c., the duty is increased from 6·60 roubles to 7·45 roubles per funt. Category 197.—Handkerchiefs, increased from 3·95 r. to 4·45 r. per funt. Category 198.—Tissues, cloths, and ribbons of half silk, &c., increased from 2·90 r. to 3·30 r. per funt. Category 199.—Silk and half silk trimmings, increased from 1·30 r. to 1·50 r. per funt. Category 89 (2*a*).—Silk, twisted and wound, &c., not coloured, increased from 16 r. to 24 r. per poud. Category 89 (2*b*).—Silk, coloured and printed, increased from 32 r. to 48 r. per poud.

## Odds and Ends.

Parcels not exceeding 7 lbs in weight can now be received at any post office in the United Kingdom for transmission to Iceland and the Faroe Islands, *via* Denmark. For a parcel, not exceeding 3 lbs., *via* Hamburg, 1s. 5d.; exceeding 3 lbs. but not exceeding 7 lbs., 2s. For a parcel, not exceeding 3 lbs., *via* Cologne, 1s. 9d.; exceeding 3 lbs. but not exceeding 7 lbs., 2s. 2d. No parcel must exceed 2 feet in length, breadth, or depth.

* * * *

In order to give the necessary tension to silk tissues, Burty Nicolas, of Lyons, France, proceeds as follows:—Two cords are wound on the two ends of the rollers on which the piece is rolled. These wind on bobbins, having the same diameter as the roller. An iron bar, which holds the two bobbins, is provided in the middle with a lever on which weights are placed, these weights varying according to the tension to be given to the issue.

* * * * *

The deputation of fifty working men and women from the United States, have been spending a few days in this country on their way to Paris, to report upon the Exhibition. They have visited Liverpool, Manchester, Bradford, Leeds, Sheffield, Birmingham, and other places, and have of course seen London. They have been well received at each place they have visited, although their visits to Bradford and Leeds would have been more interesting had they occurred on another day than Bank Holiday. The deputation consists of those only who have made themselves noticeable in their own particular branches of trade, by inventing machinery and appliances and so on. Each one has been selected by a trade vote. The deputation will visit Germany and Belgium.

* * * * *

It will interest many of our readers to know that, following the legislation of England and India for preventing the piracy of trade marks and the counterfeit description of goods and wrongful description of country of origin, a Royal decree of last year, prohibiting the importation into Sweden of any goods manufactured abroad bearing marks calculated to give the false impression that such goods have been manufactured in Sweden, came into force on the 1st ultimo. By Section I., it is provided that if, to any merchandise that is imported from abroad, there is applied the name of a place, works, or manufacturer situate in Sweden, or other indication that the goods have been manufactured in Sweden, such shall be seized and forfeited, except in cases where having been manufactured in Sweden they have been first exported and then re-imported; and Section IV. extends the decree to apply to the marks upon any package or case in which the goods are kept or stored for sale.

* * * *

The Board of Trade have issued a memorandum as to the mode of procedure which they propose to adopt at the hearing of objections to the classifications of merchandise traffic, and schedules of maximum rates applicable thereto, submitted by the Railway Companies under the provisions of the Railway and Canal Traffic Act, 1888. The Board of Trade will take for the purpose of discussion of the classification of merchandise traffic and the general conditions applicable thereto, the schedule of the London and North-Western Railway Company. Objectors who have lodged any objections to the schedules of any other Railway Company, will be allowed to appear and support those objections, so far as they are applicable, as if they had objected to the schedule of the London and North-Western Railway. Objectors will be allowed to appear by themselves, or by any duly authorised representative. The first sitting will be held at 8, Richmond Terrace, Whitehall, on Tuesday, October 15th, at eleven o'clock, a.m., and the first point for discussion will be the second clause in the general conditions of the revised schedule of maximum rates and charges of the London and North-Western Railway.

# PATENTS.

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## Patents Sealed.

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|---|---|---|---|---|---|---|---|
| 5,632 | 5,945 | 7,319 | 7,711 | 8,898 | 8,944 | 9,018 | 9,426 |
| 9,789 | 11,137 | 6,542 | 8,257 | 8,927 | 9,118 | 9,124 | 9,269 |
| 9,255 | 9,310 | 9,382 | 9,406 | 9,477 | 9,527 | 9,932 | 10,191 |
| 16,133 | 472 | 4,404 | 4,431 | 4,464 | 4,603 | 4,688 | 5,028 |
| 5,215 | 16,069 | 6,007 | 6,570 | 6,647 | 7,518 | 7,620 | 7,641 |
| 8,009 | 8,964 | 8,968 | 9,191 | 9,311 | 9,419 | 9,746 | 9,791 |
| 15,145 | 79 | 2,012 | 3,445 | 5,301 | 5,389 | 5,499 | 5,741 |
| 6,969 | 7,822 | 8,719 | 9,429 | 9,530 | 9,600 | 9,840 | 10,009 |
| 10,142 | 10,416 | 10,815 | 12,199 | 2,948 | 5,204 | 5,206 | 5,763 |
| 5,504 | 7,377 | 8,229 | 9,892 | 10,033 | 10,065 | 10,127 | 10,226 |
| 10,314 | 10,453 | 10,479 | 10,503 | 10,552 | 10,653 | 10,748 | 14,205 |
| 14,836 | 17,300 | 2,770 | 5,879 | 6,304 | 6,383 | 6,456 | |

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# The Journal of Fabrics AND Textile Industries.

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## Contents.



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## The Textile Industries of British India.

The following information respecting the textile manufactures of British India is extracted from the Statement exhibiting the Moral and Material Progress and Condition of India during the year 1887-88, ordered by the House of Commons to be printed on the 16th August last, and published in "The Board of Trade Journal." The domestic industries of India, such as weaving and spinning, pottery, brass-work, iron-work, and art work of many kinds, continue to be practised after ancient methods all over the continent of India. But Indian fabrics and products, made on a small scale by workers at their homes, have for years past been giving way before the far cheaper cotton yarns and fabrics, the products of British factories. Meanwhile, without any protection, favour, or advantage, other than is afforded by cheap Indian labour, and by the production of raw materials in India, an important manufacturing industry is growing up, and steam-power factories are at work, among which are those for spinning and weaving cotton, for spinning and weaving jute, &c. There were 97 cotton mills at work, of which three-fourths were in the Bombay Presidency, and which altogether represent a capital of Rx. 10,000,000. These cotton mills employ over 80,000 hands, and, with their 18,400 looms and 2,375,379 spindles, consumed 2,526,000 cwt. of raw cotton in 1887-88 as compared with 2,371,000 cwt. in 1886-87. There has been also considerable progress in the jute industry; the 25 jute mills, mostly in Bengal, employ 56,000 hands, worked up 175,000 tons of jute, or 30,000 tons more than in the previous year. Among other "large industries," which are shown in the Indian returns for 1887-88, may be mentioned:—three woollen mills, nine silk mills, and two hundred and forty eight cotton and jute presses. These do not include silk filatures where raw silk is wound by hand. Returns of village and domestic industries are made at the census once every ten years, and do not find place in the annual reports. There were at work in the Hyderabad assigned districts 26 steam cotton presses, an increase of two; but, owing chiefly to the partial failure of the crop, the out-turn fell off from 297,905 to 226,498 bales of cotton pressed. The quantity of jute worked up in the mills of the Presidency division of Bengal was 90,329 tons, against 76,800 tons in the preceding year. Indigo prospered during the year in the Presidency division. In Bhagulpore the out-turn generally fell off, owing to unseasonable rain and early floods, but prices were slightly better. The four cotton mills of the Presidency division worked up 7,685 tons, which showed a decrease of 645 tons; the value, however, was greater by about Rx. 40,000. A feature of the season was the increase in the export to China of yarn from the Calcutta mills. The following remarks by the Burdwan Commissioner are stated to agree in substance with reports received from all parts of the Lower Provinces:—"In spite of the importation of cheap European piece-goods, cotton is still woven by local weavers in every district. As a rule, they know no other work, and cling to their ancestral business to obtain a precarious means of living. This industry is, however, on the wane, as the weavers cannot compete with Manchester in the production of cheap goods. In Burdwan, a revival of this industry has been noticed in the last two years, but, generally, although those who can afford them prefer the country cloths, which are of a better texture and more durable, the cheapness of Manchester goods drives the local manufacture out of the market." In the Moorshedabad district, there were, during the year, 77 filatures, which produced 371,458 lbs. of silk, valued at Rx. 233,818, against 230,120 lbs., valued at Rx. 172,276, in the preceding year, when 91 filatures were at work. The manufacture of silk fabrics in Bhagulpore and Maldah was also declining, owing to the competition of European-made goods of a better and cheaper quality. It is reported that attempts are being made to improve the quality of the silk by inducing the natives to take more care of their worms, and by the judicious use of European mulberry seeds. With this view, European seed has been distributed, and foreign cocoons have been introduced. Some experiments are also said to have been made successfully to get over the difficulty of spinning tussah by means of a chemical process. There are various manufactories in the North-West Provinces and Oudh, of which the principal are 2,210 indigo factories, employing 66,530 hands. Five cotton mills employ 3,580 hands, and there are also 13 cotton presses. Cotton spinning and weaving by hand, which form the chief manufacturing industry in the Madras Presidency, are steadily declining before the cheap machine-made goods imported from European countries. Owing to the loss of their usual occupation, several of the weaving class in the Vizagapatam district are said to be migrating to other countries in search of employment. In other districts also they are turning their attention to cultivation and other means of livelihood. The number of private looms in the different districts was 284,000, of which 267,700 were for the manufacture of cotton goods, 3,369 for silk cloths, and 9,737 for woollen goods. There were 32 cotton presses, but two of them were not worked during the year. The out-turn of work done at the remaining presses was 737,165 cwt. of cotton pressed, against 614,226 cwt. in 1886. Six cotton mills were worked during the year, four at Madras, one in Bellary, and one in Tinnevelly. Their out-turn amounted to 102,600 cwt. of cotton twist, yarn, and cloth. The prosperity of the cotton mill industry continued unabated throughout 1887. Notwithstanding a large addition to the number of spindles in operation, and a still larger increase in the production, there was no congestion of stocks, the markets in China and Japan continuing to absorb increasing quantities of Bombay-made yarns. The number of spindles in the mills worked by steam-power in this Presidency, including Native States, increased from 1,698,797 in 1886 to 1,779,220 in the year under report. The number of mills was 55 in Bombay and its suburbs, and 20 in the Mofussil, against 50 and 20 respectively in the previous year. The cotton gins and presses in Khandesh are reported to have been increasing to such a remarkable extent that even if the native hand-wheel for cleaning cotton falls entirely into desuetude, there will not be sufficient employment for them. The hand-loom weaving industry in the Ahmednagar district has, of late years, greatly diminished, and the "Nagar carpets," which were so well known in former years for the superiority of their designs and their general excellence, are not now procurable. The Surat dealers in art fabrics, such as embroideries and cloth of gold, showed their anxiety to keep their wares before the public by sending numerous exhibits to the Glasgow Exhibition. An increase in the amount of cotton worked up, and in the amount of labour employed, appears in all the mills of the Central Provinces, and especially in the Jubbulpore mills, which were established in 1885. On the Calcutta jute trade, the "Calcutta Englishman," for August 3rd, says:—"We are able to give some recent returns of the trade in jute manufactures which have a special value at the present time. The trade to foreign ports we give for 1888-89; the internal trade—coasting, rail, and river—is only as yet known for 1887-88. The quantities of jute bags and cloths exported from Calcutta were as follows:—To foreign ports (1888-89) 96,906,623 jute bags, 15,018,171 yards jute cloths. To Indian ports in and beyond the province, 43,213,553 jute bags, 5,553,217 yards jute cloths. By rail to all ports in and beyond the province, 18,985,120 jute bags, yards jute cloths unknown. By river beyond the province, 1,781,658 jute bags, 5,981 pieces jute cloths. The exports of cotton from the United States in 1888 amounted to 4,696,017 bales. Add to this the quantity used in mills in the country, and we have between six and seven million bales. The New York "Financial and Commercial Chronicle" gives 7,050,000 bales (net weight of each 466 lbs.) as the production of last year. We may thus form a fair idea of the quantity of jute consumed in covering seven million bales of cotton."

## New Designs in Fabrics.

The fashion in dress materials appears to undergo little change, ornamental designs being still very popular, and we see no reason why the taste for them should not continue and increase for some time, as the goods put upon the market are certainly most attractive. We have, on previous occasions, given designs for dress materials in our pages. These have been favourably received by a numerous section of our readers and, therefore, in this number we show several new patterns. The first is a design—shown on our third separate plate, suitable for a panel, or deep border, for dress material, and is intended to be enlarged considerably, so as to be the length of the dress if for a panel, and not less than 24 ins. deep if for a bordered robe. The pattern is effective, and in a style well suited for such a purpose, and if woven in pleasing shades should be a saleable design. Any two harmonious shades or colours would be sufficient to produce a good cloth, but an additional colour would still add to its effectiveness. The shades of crushed strawberry would be suitable, the lightest, which might be of silk, and the darkest should be used for the figure. Another effect would be obtained by using two shades of fawn and a cream silk, but the colourings might be multiplied almost indefinitely, as any two or three shades could be used with advantage. The bottom portion of the panel is arranged to show a narrow border, and this is intended, besides being part of the panel, to be used separately as a narrow border. The design on our second separate plate is for a dress material, the pattern of which covers the whole surface, and is usually understood as an all-over pattern. For its purpose, it is somewhat original in style, being suggestive of corn stalks and flowers. This may be made in its present size, but a better pattern would result if it were considerably enlarged. The centre object may be in a different shade from the flowers and leaves, or all the figuring may be in the same colour. For instance, take two blue greys alone, or add a pale brown, or crushed strawberry, or crushed strawberry and fawn, with the addition of myrtle green, or blue grey if a third colour should be wanted. Three silver greys would also look well. Turning to the patterns shown upon this page, the first one is intended for a striped dress goods, and is original in character. The stripes may be arranged any distance apart as may be required, or the pattern may be enlarged and used as a border to plain material. The illustration shows the use of four shades. The ground is dark grey, and the principal portion of the figure is black, with a greenish brown and cream white for the remaining colours. If three colours only are required, use the white and black as one. Thus a brown ground could have a myrtle green and white worked upon it, or two shades of myrtle and a fawn could be employed. Two Indian reds, with a darker shade, such as maroon or black, would also be effective. The next pattern shown is intended either as a striped or an all-over material, although the sketch shows it as a stripe. However, the design is simply a repetition of one complete figure, and this may be arranged as shown, or at regular intervals as an all-over pattern. We give it in three shades, the ground being in a dark silver grey, with the figure in cream and black, or a grey much darker than the ground. A pale grey-green ground could have the inner portions of the figure in Indian red, and black in place of the cream above mentioned. Brown, black, and fawn would give a quieter effect. Another pattern shown is for a striped material, and four colours are used. Two of these are for the ground, which has a mottled appearance. The ground is dark violet, with the mottle in a lighter violet. The figure is black surrounded by white. However, any two shades for the ground would correspond with the black and white of the figure. Should this treatment be too elaborate, the mottle may be omitted, and the ground may be in pale violet and the figure in dark violet, outlined either in white or any suitable shade. This design is original in character, and should be effective either for a stripe or a border. The feeling for leno dress materials appears to be rapidly increasing amongst a section of manufacturers. Several enquiries have been made to us for designs of this description. We, therefore, give a small one for a striped leno, which may be varied considerably by the user. Thus any number of narrow stripes of leno may be employed, and these may be succeeded by the broader ornamental leno stripe, or by one of plain material. In giving the various effects of colour suitable for these designs, it will be noticed that prominence is given to black, this having been for a considerable time much in request for dress materials, in combination with other colours. The greens, greys, fawns, browns, and violets above mentioned are also favourite shades. We may say that we shall be glad to supply any manufacturer with designs for almost any class of material, at reasonable prices. On the subject of new colours, *Demorest's Monthly Magazine* says:—Green is still cultivated by fashion, and is first on the list, with various titles to designate the preferred shades. "The new green, almost a reseda, is named spoilito; centaure is the appellation given to two shades of light and dark serpent green; artichaut is a mossy tint; lentille includes several shades of pea-green; and sarcelle designates the beautiful emerald hues of the teal duck. Verveine is verbena green; and fougère, fern or grass green. From green to blue is Nature's own transition, and the leading shades are rovigo, a new gobelin colour, and vichy, which is the name of several blues of the electric-blue class, beginning with the light electric

and running through a gamut of shades to a deep grey-blue. Sofala is a sombre grey, and cherso a new grey-blue, most attractive in combination with reseda or pale raspberry for evening wear. Mahogany colours are known as tison, coleus, infernal and acajou. A golden brown is meja, and moka is a deep coffee-colour. Reddish and purplish browns are even newer than the golden and mahogany shades. In these colours, Californe includes ten shades, ranging from light to dark of reddish brown; marquise is a series of rosewood tints; Massa is a coppery shade of rosewood; and centenaire, in five shades, begins with poppy red and runs to a rich, dark, blood crimson. Silvery shades of drab are called nickel or aluminum, and the grade of shades slides readily into castor tints, called argus greys. Lavender, heliotrope, glycine, auberge, dahlia, and anemone are all familiar colours, and besides these are the usual evening shades." To this list of colours may be added an electric shade called Edison, and a rust colour called Eiffel red, but, no doubt, the one which takes the first place is a new mahogany shade called "le Buffalo Bill." What next?

## Warp Weaving and Knitting without Weft.

Respecting this machine, which was described in our two last issues, the inventor, Mr. Paget, has furnished us with further particulars of the capabilities of the apparatus, and as a number of manufacturers of various classes of fabrics have been inclined to doubt the accuracy of some of the statements that have been made as to its merits, we hope the following facts will satisfy them that the machine will do all that has been claimed for it. However, if there are still any doubters, a visit to Messrs. A. Paget and Co.'s factory at Loughborough will amply repay them for the journey, and will undoubtedly convince them of the great advantages of the apparatus over machines now in general use. Mr. Paget exhibited an enlarged working model of the machine, thirty-two times full size, by means of which the action of the three primary parts was illustrated in weaving a piece of bell-rope into a portion of a fabric. He also showed specimens of the actual primary parts themselves, fixed upon a card in the relative positions that they occupy in the machine, of which a section was also drawn upon a card. An extensive collection of samples of the various kinds of work produced by the machine was exhibited. One of these was a towel, at the ends of which was seen the fringe produced by the apparatus described in the paper, and attention was drawn to the closeness of the weaving. The great difficulty with warp weaving hitherto has been to weave a close solid fabric, because the loops could not be got over the heads (or hooks) of the needles in close weaving, as they then fitted the needles too tightly. The reason why, with this machine, the tight loops could be got over the needles was the addition of the hooks for pulling the loops over the heads of the needles and for holding the loops after they had been pulled over the needle heads, whereby the loops were tight after having passed over the needle heads. A sample exhibited of striped weaving was produced by making the troughs shog twice to the left, then twice to the right, and so on. But if, instead of two, they made four or more shogs each way, then, instead of a stripe, a zig-zag was produced. The machine had been further elaborated so that the number of shogs right and left could be varied automatically without stopping the machine, as shown by another specimen; in one portion of the weaving, the troughs were traversing two needles to the right and two to the left; during the next portion, four to the right and four to the left; during a further portion, six to the right and six to the left; and then, again, they resumed traversing two to the right and two to the left. These and other peculiar permutations of pattern were produced by the apparatus, which was governed by the Vaucanson chain, as explained in the paper; the number and position of the inclines upon the chain were adjusted beforehand according to the pattern desired. As an example of shaping the fabrics, a sample was exhibited of a lady's petticoat which had been woven and shaped on the machine. By making the loops longer towards the bottom of the fabric, it was widened at that part; and then step by step, at a varying number of stitches apart, the length of the loops was reduced, thus reducing the width. A still further development of the shaping was shown in a sample of a lady's vest woven to suit the figure. It was shaped on the machine at the rate of 120 courses a minute, and this was the only machine that had been able to weave in warp fabrics an article of any kind shaped automatically. Mr. Paget replied, in answer to a question, that the body was woven from the front upwards, over the shoulder, and down again at the back. The weaving began at the bottom in front, then widened out to suit the hips, then narrowed to suit the waist, then it widened again to suit the bust, and then narrowed again to suit the neck, and then the weaving went over the shoulder and down the back. It was narrowed from the shoulder to fit the waist, again widened to fit the hips, and ended, behind, level with where it had started in front. The lines of the two pairs of selvages were seamed by hand afterwards from each arm-hole downwards; the selvages were so good that it was doubtful whether the seam could be seen at a little distance, even though it was known to be there. The whole of this work was woven from beginning to end at 120 courses per minute without varying. The sleeves were also woven on the warp machine, and were afterwards sewn in at the arm-holes of the vest by another machine. In this particular specimen, it so happened that the sleeves had been made on a knitting machine, and not on the warp machine, and in this case, therefore, the web of the body was opened out at the shoulder, and was actually put upon the needles of the knitting machine, and the sleeves were then woven on to the body. The sleeves woven and shaped on the knitting machine were made at the rate of only about 25 courses per minute, and only two sleeves were knitted at once, instead of six sleeves being woven at once on the warp weaver and at the rate of 120 courses a minute, and instead of teaching an operative to work the weaving machine in about a fortnight, it requires months for a girl to learn to work the knitting machine. Another curious development of warp weaving was that the same machine which wove an exceedingly coarse cloth like a horse-rug, and a very fine thin soft texture for making woollen vests, such as would be liked in a hot country by those who would avoid rheumatism, also wove the light and open sample shown of a lady's cloud, which was 8 feet wide when stretched out. The clouds were woven 6½ feet long, and five at once in the width of the machine, the set of five being completed in a trifle over 2¼ minutes, so that it might be said each cloud required only about half a minute to be woven on the machine. History told of a certain French king who had a pair of stockings woven for his wife, so fine that they would pass through a finger ring. The cloud exhibited was considerably wider than any pair of stockings, as it was 8 feet wide, and when doubled lengthways was, therefore, equivalent to 16 feet wide, and when thus doubled it easily passed through his finger ring, as he now showed. Mr. Paget also stated that the machine would weave either coarse sacking for nail-bags, or much finer articles than any of the samples now exhibited. An enthusiastic friend, who was well versed in all the details of hosiery manufacture, had expressed the opinion that before long the machine would be able to weave handkerchiefs of the finest silk. Although, he did not himself at present go quite so far as that, yet, he would not say that it never would be done. The range, however, covered was a pretty extensive one. Professor Alexander B. W. Kennedy, Member of the Council, said he had had the pleasure of spending a couple of days in the examination of this machine, and had, therefore, had a good opportunity of seeing what a beautiful machine it was, and he regarded, with the utmost admiration, an invention displaying so high a degree of mechanical engineering ingenuity. He had had the opportunity of timing a great deal of the work, and of seeing exactly how the machine produced fabrics of different kinds. The machine which he had then seen at work was not the particular one now shown in the Exhibition, but an earlier one, though in principle it was exactly the same. It had 1,008 needles, pitched twelve to the inch, and all the work that he saw produced was done with the same machine and with the same pitch of needles. The first work that he saw done was a somewhat heavy towelling, of which the author had now shown an example. The machine being 84 inches wide, the towels were made in three parallel sets, each set being 28 inches wide. The machine being started, it made the right number of courses, and then stopped automatically. When it stopped, the attendant put in gear the hook frame for making the fringe, pulled out by hand the requisite length of fringe, withdrew the hook frame, and started the machine again; then it again went on automatically to the right length, doing everything on its own account between the stoppages. The whole time of weaving each towel length, including the fringe, was 15½ minutes, so that there were twelve towels made entire, per hour, and nothing more had to be done to them but to cut the fringes in halves. What had struck him most was what he next saw produced in the machine. It was a cloud, or rather five clouds woven side by side. They were made with 2½ courses of loops per inch of length, that is, the fabric as it was woven moved forward one inch for every 2½ courses. It was precisely the same fabric as the specimen which had now been shown. Immediately after the clouds had been finished with a certain very fine yarn, without any change whatever, excepting the motion of one lever, if he remembered rightly, the pitch or closeness of the work was altered from 2½ courses to 67 courses per inch of length, and at once the machine went on working the close-woven and shaped garments which had just been exhibited. The stitch was the same, excepting only that in one instance it was 4-9ths of an inch long, and in the other it was only 1-67th of an inch. No one would imagine, unless he saw this done, that the open cloud and the close-woven material were absolutely one and the same fabric, woven on one and the same machine, without any difference, except in the number of stitches per inch. He had got a piece of the fabric that had been cut out where the change was made, in which the piece of cloud appeared like an open netted fringe on the end of the piece of closely woven vest. According to a note which he had made at the time, the length of 6½ feet was finished in three minutes, five clouds being made side by side, which meant that 100 clouds per hour were made on the machine. They were woven continuously, and had afterwards to be cut to the length required. The whole process had to be seen to be believed, as had also the shaping of the shaped vests, and the simplicity of the manner in which the latter operation was carried out had certainly not been exaggerated by the author. When the machine was working at that extraordinary rapid rate, it would be no good if two or three hours had to be spent in changing the beams; and here the author's ingenuity had developed a plan so remarkbly simple that the time now taken in changing the beams was about as many minutes as it used to be hours. The threads wound on the beam were necessarily led off it over a reed in the beaming or warping machine, the reed being arranged so as to pitch them the right distance apart for the needles and troughs. Instead of taking the threads over one reed only, they were taken across two, and under the threads was placed a grooved wooden trapping-bar, in which they could be held by a wedge pushed in from above. When

it was desired to trap or hold them, the threads were lying exactly pitched across the reed, and all that was done was to drive the wedge in, so that all the threads were held fast between the wedge and the two sides of the trapping-bar. All the ends of the threads were thus secured at exactly the proper pitch, corresponding with the reed, which was the same as that corresponding with the needles, so that each thread had not to be threaded separately, but the whole series was simultaneously entered into the open mouths of the troughs. The result he had found to be that the taking out of the two empty beams and putting in two full ones, each containing 504 threads, took only 8½ minutes. The utmost manual exertion was a light pull on the rope of the hoisting gear which formed part of the machine. The 504 threads of one beam were then entered into their respective 504 troughs, which took exactly ten seconds, and was done by the girl who attended the machine. The whole of this latter operation, including the adjustment of the few threads which had not entered the troughs quite accurately, took just one minute; and from the time when the trapped ends of the threads were brought to the front of the machine, until the whole 1,008 of them had been properly placed and secured by two courses worked by hand and the traps removed, was not more than 3½ minutes. Threads had then to be taken out, at four intervals, for spacing the work into five breadths, and new selvage and mending bobbins had to be put in for suiting the new yarn, but with all this, and all other delays, including the overhauling of the needles, the whole time taken by the change of beams, from stopping the machine for the purpose until it started again on the new work, was exactly 25 minutes. A further point to which he should like to call attention was the regulating or equalising arrangement, or reservoir-bar as it was called in the paper, by which it was contrived that the thread beam was kept steadily in motion at almost a constant rate, thereby enabling the machine to be driven at a much higher speed than could otherwise be attained. The speed with which the thread was pulled by the needles varied very greatly indeed in each course, but, on watching the working of the machine most carefully, he had found that the speed with which the thread came off the beam was, as far as he could see, practically uniform. That was the result of an admirable arrangement, which had also the merit of being very simple, and he only wished that more of such simple contrivances could be found out and brought to so successful an issue. Mr. Daniel Adamson, vice-president, said he had had the satisfaction of seeing the machine working, and being somewhat interested in cotton spinning and the manufacture of soft goods, he would say that practically there was an advantage to the thread manufacturer in the circumstance that for this machine there was only one quality of yarn or thread to make, instead of the usual twist or weft also, because, in the latter case, in spinning with 100,000 spindles, where there might be 50,000 spinning warp and 50,000 spinning weft, a great deal of inconvenience might arise if orders were not received corresponding with the relative qualities produced of the two particular kinds spun. It had often occurred that such was the condition of the markets that the spinners had not the chance of regulating their sales so as to meet their powers of production, and, in the present case, therefore, the matter was simplified by dispensing with the weft. Mr. J. J. Birckel believed this was the only machine for producing fabrics such as were made by spinning, knitting, or weaving, in which there were motions that were required to be controlled automatically within 1-50th of an inch. Such a control had never before been realised in any machine of that class; and its accomplishment might well place the author in the foremost rank of mechanical engineering. Although himself no spinner, he believed the self-acting spinning mule did not realise by a long way such a nicety of deviation of motion as only 1-50th of an inch. In reference to the wear and tear of the machine, Mr. Paget stated that only one had as yet been running for about two months making samples, in order to ascertain what it could do, and it was not possible, therefore, at present to speak positively as to its wear and tear. Inferentially, however, he could speak confidently, because the presser and the needles and the hooks were the parts on which the chief wear would come, and only recently he had happened to see his first knitting machine, having similar working parts, which had been set to work in 1862, and was still runing satisfactorily after twenty-six years' regular work.

## The Silk Industry in Turkestan.

The "Turkestan Gazette" publishes an official account of a tour recently made by the Governor-General through that province. The condition of the country is pronounced to be generally satisfactory, even from an economic point of view, but the decay of the silk industry is deplored, and various remedies are suggested for its revival. The decline of the industry is traced to the disease among the silkworms, which has reduced the silk product to one-fourth what it was four years ago. An extreme case is given of what happened on the market of Khodjent, where, in 1885, 30,000 pouds of cocoons were sold for 300,000 roubles, while last year only 4,000 pouds were disposed of for 50,000 roubles. Among the remedies tried has been the importation of Milanese and Japanese grains, but a certain degree of success has only been attained in the case of the latter. Not discouraged, however, fresh efforts are to be made this year with healthy grains from Corsica and Bokhara.

## Tariff Changes and Import Duties.

*(Continued from Page 26).*

### FOREIGN IMPORT DUTIES ON LINEN, HEMPEN, AND JUTE WOVEN MANUFACTURES.

The following, which is in continuation of the statement published in last month's issue of the Journal, shows the rates of Customs duty levied in each of the undermentioned countries upon the importation of linen, hempen, and jute woven manufactures from the United Kingdom.

NOTE.—Since the publication of the return relating to Foreign Import Duties (178/85), numerous modifications have been effected in the Customs Tariffs of various foreign countries; these modifications, in so far as regards the above-named goods, have been embodied in the following statement:—

| Tariff Classification in each Country. | Rates of Duty. | | English Equivalents. | | | |
|---|---|---|---|---|---|---|
| AUSTRIA:— | | Fl. Kr. | | £ | s. | d. |
| Tissues of flax, hemp, jute or other vegetable fibre (except cotton), without admixture of cotton, wool, or silk:— | | | | | | |
| Coarse grey packing cloth of flax or hemp, unbleached, plain, or simply twilled, but not figured, containing not more than 5 warp threads per 5 millimetres; also sacks made of such cloth | 100 kilos. | 2·00 | Cwt. | 0 | 2 | 0½ |
| Linen tissues, not figured and unbleached, having up to 20 warp threads per 5 millimetres | ,, | 12·00 | ,, | 0 | 12 | 2 |
| Do., bleached, dyed, woven in colours, or printed, but not figured:— | | | | | | |
| Having up to 10 warp threads per 5 millimetres | ,, | 20·00 | ,, | 1 | 0 | 4 |
| Having from 11 to 20 warp threads per 5 millimetres | ,, | 40·00 | ,, | 2 | 0 | 8 |
| Do., figured, having up to 20 warp threads per 5 millimetres:— | | | | | | |
| (*a*) Unbleached | ,, | 40·00 | ,, | 2 | 0 | 8 |
| (*b*) Bleached, dyed, woven in colours, or printed | ,, | 80·00 | ,, | 4 | 1 | 3 |
| (*c*) Damask of all kinds, including unbleached damasks | ,, | 80·00 | ,, | 4 | 1 | 3 |
| Do., fine, having more than 20 warp threads per 5 millimetres; unbleached, bleached, dyed, woven in colours, printed, or figured | ,, | 80·00 | ,, | 4 | 1 | 3 |
| Batiste, gauze, lawn, and other open-woven tissues | ,, | 120·00 | ,, | 6 | 1 | 11 |
| Tissues, &c., mixed with metal threads | ,, | 160·00 | ,, | 8 | 2 | 6 |
| Laces, edgings, and embroidered tissues | ,, | 300·00 | ,, | 15 | 4 | 11 |
| Velvety tissues with cut or uncut pile | ,, | 80·00 | ,, | 4 | 1 | 3 |
| Jute tissues:— | | | | | | |
| Sacking and packing cloth, raw, unbleached, undyed, unfigured, plain or simply twilled, having not more than 5 warp threads per 5 millimetres; also ready-made sacks of such cloth | ,, | 6·00 | ,, | 0 | 6 | 1 |
| Tissues for furniture covers and wearing apparel; carpets, and all tissues of jute in combination with other vegetable textile materials (including cotton) provided that the jute threads preponderate; plain or embroidered and combined or not with metal threads | ,, | 40 00 | ,, | 2 | 0 | 8 |
| Mats, matting and waggon covers of jute or other vegetable fibres, not otherwise specified, whether bleached, dyed, printed, figured, or not; also all tissues of jute not specially mentioned | ,, | 12·00 | ,, | 0 | 12 | 2 |
| Haberdashery, hosiery, buttons, tapes, &c. | ,, | 80·00 | ,, | 4 | 1 | 3 |
| Ready-made clothing | As the material of which principally composed, with an addition of 40 % | | | | | |
| Oil or waxed cloth:— | | | | | | |
| Coarse, unprinted, packing cloth | 100 kilos. | 6·00 | Cwt. | 0 | 6 | 1 |
| Tarpaulins and floor cloth | ,, | 20·00 | ,, | 1 | 0 | 4 |
| Other kinds, including waxed muslin | ,, | 30·00 | ,, | 1 | 10 | 6 |

| Tariff Classification in each Country. | Rates of Duty | | English Equivalents. | | | |
|---|---|---|---|---|---|---|
| | | | | £ | s. | d. |
| SWITZERLAND :— | | Frs. Cts. | | | | |
| Tissues of linen, hemp, jute, or other similar vegetable substances ;— | | | | | | |
| Packing cloth, having not more than 25 threads per 3 centimetres | 100 kilos. | 1·50 | Cwt. | 0 | 0 | 7¼ |
| Tissues plain, twilled, or figured :— | | | | | | |
| Unbleached, or half-bleached, having from 25 to 40 warp threads per 3 centimetres | ,, | 4·00 | ,, | 0 | 1 | 7½ |
| Do., do., having more than 40 warp threads per 3 centimetres | ,, | 16·00 | ,, | 0 | 6 | 6 |
| Bleached, dyed, printed, or woven of dyed threads, except tulle | ,, | 16·00 | ,, | 0 | 6 | 6 |
| Tulle, plain or figured, unbleached, bleached, dyed, or printed | ,, | 30·00 | ,, | 0 | 12 | 2 |
| Haberdashery, tapes, &c. | ,, | 16·00 | ,, | 0 | 6 | 6 |
| Hosiery, without needlework | ,, | 16·00 | ,, | 0 | 6 | 6 |
| Laces and embroidery | ,, | 30·00 | ,, | 0 | 12 | 2 |
| Oil or waxed cloth :— | | | | | | |
| Oiled cloth for packing | ,, | 8·00 | ,, | 0 | 3 | 3 |
| Common waxed cloth for do. | ,, | 3·00 | ,, | 0 | 1 | 2¾ |
| Waxed cloth for furniture, hangings, &c. | ,, | 16·00 | ,, | 0 | 6 | 6 |
| Floor cloth, linoleum | ,, | 20·00 | ,, | 0 | 8 | 1½ |
| Ready-made clothing | ,, | 30·00 | ,, | 0 | 12 | 2 |
| Mats and carpeting of Manilla hemp or other similar vegetable fibre :— | | | | | | |
| Plain | ,, | 10·00 | ,, | 0 | 4 | 0¾ |
| Dyed, printed, &c. | ,, | 15·00 | ,, | 0 | 6 | 1¼ |
| Jute carpeting | ,, | 7·00 | ,, | 0 | 2 | 10¼ |
| GREECE :— | | Drs. Lep. | | | | |
| Tissues of linen, hemp, or jute :— | | | | | | |
| (*a*) Containing less than 12 warp threads in the space of 5 square millimetres, with the exception of coarse hempen sacking | Oke | 1·10 | ,, | 1 | 15 | 2 |
| (*b*) Containing 12 warp threads and above in the space of 5 square millimetres | ,, | 3·00 | ,, | 4 | 16 | 0 |
| (*c*) Hemp or jute carpeting | ,, | 0·80 | ,, | 1 | 5 | 7 |
| Coarse hempen sacking | ,, | 0·30 | ,, | 0 | 9 | 7 |
| Sail cloth | ,, | 0·20 | ,, | 0 | 6 | 5 |
| Lace and embroidery | ,, | 30·00 | ,, | 48 | 0 | 0 |
| Tulle, gauze, batiste, and other open-woven tissues | ,, | 16·00 | ,, | 25 | 12 | 0 |
| Haberdashery, edgings, tapes, &c., and velvets stuffs ; also underclothing | ,, | 6·00 | ,, | 9 | 12 | 0 |
| Ready-made clothing for men and boys | As the tissue of which composed, with an addition of 50 % | | | | | |
| Do., do., for women and girls :— | | | | | | |
| Plain | Oke | 20·00 | Cwt. | 32 | 0 | 0 |
| With embroidery or lace | ,, | 30·00 | ,, | 48 | 0 | 0 |
| Oil or waxed cloth :— | | | | | | |
| For furniture, hangings, &c., and clothing of oiled cloth | ,, | 1·00 | ,, | 1 | 12 | 0 |
| Floor cloth | ,, | 0·30 | ,, | 0 | 9 | 7 |
| TURKEY :— | | | | | | |
| All kinds | 8 % *ad val.* | | 8 % *ad val.* | | | |
| ROUMANIA :— | | Lei. B. | | | | |
| Tissues of linen, hemp, or jute :— | | | | | | |
| Tissues of linen, plain, unbleached, of any quality | 100 kilos. | 45·00 | Cwt. | 0 | 18 | 3 |
| Tissues of hemp, plain, unbleached | ,, | 75.00 | ,, | 1 | 10 | 6 |
| Tissues of linen or hemp, twilled, unbleached, bleached, or woven in colours | ,, | 75·00 | ,, | 1 | 10 | 6 |
| Tissues of jute, very common, and sacks made from such tissues | ,, | 5·00 | ,, | 0 | 2 | 0⅔ |
| Ticks of all kinds, unbleached, bleached, or woven in colours | ,, | 100·00 | ,, | 2 | 0 | 8 |
| Plain linen cloth known as "Holland," of all kinds, unbleached or dyed | ,, | 150.00 | ,, | 3 | 1 | 0 |
| Do., do., do., bleached | ,, | 160·00 | ,, | 3 | 5 | 0 |
| Do., do., do., printed ; handkerchiefs with printed designs, in dozens, hemmed or not ; table and toilet linen, unbleached or bleached, figured or damasked | ,, | 250·00 | ,, | 5 | 1 | 7 |
| Batiste and lawn ; also handkerchiefs of batiste or lawn, in dozens, embroidered or not, but without lace | Kilog. | 10·00 | ,, | 20 | 6 | 5 |
| Knitted wares of all kinds | 100 kilos. | 450·00 | ,, | 9 | 2 | 11 |
| Haberdashery, tapes, fringes, &c., unbleached, bleached or dyed | | 300·00 | ,, | 6 | 1 | 11 |
| Lace and tulle | Kilog. | 14·00 | ,, | 28 | 9 | 0 |
| Tissues of other vegetable fibres, unbleached, bleached, or dyed | 100 kilos. | 40.00 | ,, | 0 | 16 | 3 |

| Tariff Classification in each Country. | Rates of Duty. | | English Equivalents. | | | |
|---|---|---|---|---|---|---|
| | | | | £ | s. | d. |
| ROUMANIA—*cont.* | | Lei. B. | | | | |
| Carpets of linen or hemp | 100 kilos. | 120·00 | Cwt. | 2 | 8 | 9 |
| Oil or waxed cloth of all kinds ; also tarred packing cloth | ,, | 50·00 | ,, | 1 | 0 | 4 |
| Clothing, made up or not, of common linen or hempen tissues | ,, | 180.00 | ,, | 3 | 13 | 2 |
| Do., do., composed of unbleached, bleached, or coloured ticking | ,, | 540·00 | ,, | 10 | 19 | 6 |
| Do., do., of unbleached, dyed, or printed holland, untrimmed or trimmed with any other material than lace | Kilog. | 10·00 | ,, | 20 | 6 | 5 |
| Do., do., of batiste, lawn, tulle, or lace | ,, | 30·00 | ,, | 60 | 19 | 3 |
| Underclothing, made up or not, of common linen tissues | 100 kilos. | 180·00 | ,, | 3 | 13 | 2 |
| Do., do., of cotton in combination with holland, or of unbleached, dyed, or printed holland, without lace or embroidery | ,, | 510.00 | ,, | 10 | 7 | 3 |
| Do., do., of all other linen tissues, embroidered or not, but without ornaments of tulle or thread lace | Kilog. | 21·00 | ,, | 42 | 13 | 6 |
| Do., do., of all kinds, ornamented tulle or thread lace ; corsets, chemisettes, collars, cuffs, handkerchiefs, &c., combined or not with silk, ribbons, or velvet | ,, | 20·00 | ,, | 40 | 12 | 10 |
| UNITED STATES :— | | | | | | |
| Burlaps, not exceeding 60 inches in width, of flax, jute, or hemp, or of which either of those substances is the component material of chief value | 30 % *ad val.* | | 30 % *ad val.* | | | |
| Do., exceeding 60 inches in width | 40 % *ad val.* | | 40 % *ad val.* | | | |
| Brown and bleached linens, ducks, canvas, diapers, crash, huckabacks, handkerchiefs, lawns, or other manufactures not otherwise specified, of flax, hemp, or jute, or of which either of those substances is the component material of chief value | 35 % *ad val.* | | 35 % *ad val.* | | | |
| Russia and other sheetings | 35 % *ad val.* | | 35 % *ad val.* | | | |
| Sail cloth | 30 % *ad val.* | | 30 % *ad val.* | | | |
| Bagging for cotton :— | | Dol. Cts. | | | | |
| Valued at 7 cents or less per square yard | Per lb. | 0·01½ | Cwt. | 0 | 7 | 0 |
| Valued at over 7 cents per square yard | ,, | 0·02 | ,, | 0 | 9 | 4 |
| Other bagging, or similar material, composed wholly or in part of hemp, jute, or flax | 40 % *ad val.* | | 40 % *ad val.* | | | |
| Lace, insertions, and embroideries | 30 % *ad val.* | | 30 % *ad val.* | | | |
| Hemp or jute carpeting | Sq. yard | 0·06 | Sq. yard | 0 | 0 | 3 |
| All other manufactures of flax or of which flax is the component material of chief value, including underclothing, tapes, braids, stockings, &c., and all goods that cannot be measured by the yard | 40 % *ad val.* | | 40 % *ad val.* | | | |
| All other manufactures of hemp or Manilla | 35 % *ad val.* | | 35 % *ad val.* | | | |
| All other manufactures of jute | 35 % *ad val.* | | 35 % *ad val.* | | | |
| Oil cloth for floors, stamped, painted, or printed | 40 % *ad val.* | | 40 % *ad val.* | | | |
| Oil cloth foundations or floor-cloth canvas | 40 % *ad val.* | | 40 % *ad val.* | | | |

## Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, September 28th, was 285. The number in the corresponding four weeks of last year was 341, showing a decrease of 56, being a net decrease in 1889, to date, of 180. In addition to these gazetted failures, there were 261 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 265, showing a decrease of 4, being a net increase in 1889, to date, of 72. The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, September 28th, was 748. The number in the corresponding four weeks of last year was 832, showing a decrease of 84, being a net decrease in 1889, to date, of 1,672. The number published in Ireland for the same four weeks was 25. The number in the corresponding four weeks of last year was 38, showing a decrease of 13, being a net decrease in 1889, to date, of 82.

Galloways Limited, Manchester, T. Broadbent and Son, Huddersfield, and the Singer Manufacturing Co., London, have been awarded prize medals, &c., at the Paris Exhibition.

## Original Designs.

On our first plate, we given a design for a Curtain, which is suitable for either Tapestry, Chenille, or Printed Goods.

* * * *

On our second is a pattern for Dress Goods, particulars of which are given on another page, under the heading "New Designs for Fabrics."

* * * *

Our third plate also gives a design for Dress Goods, particulars of which are given under the above named heading.

## Monthly Trade Reports.

WOOL.—The advance established at the London sales has had a cheerful effect upon the wool trade generally. Staplers, during the earlier part of the month, tried to advance rates, but without much success, yet towards the close a decided rise both in Colonial and English descriptions took place, and this advance seems to have given a further impetus to the worsted trade generally. In yarns, an increased activity has been apparent, and merchants have placed numerous, if not large, orders both for home and foreign consumption. Spinners have asked extreme rates, and have mostly refused new work unless at an advance, and this has generally been acceded. In the piece branches, manufacturers have kept busy on old orders, and numerous new contracts have been entered into, generally, at higher prices in sympathy with the advance in the price of wool.

COTTON.—The progress of business has been greatly impeded during the past month in all, or nearly all, departments by the hardening tendency in the Liverpool cotton market. Quotations of all classes of goods and yarns made from American cotton have been raised, sometimes in only a comparatively small degree, and buyers have taken the view that any advance founded upon the upward movement in Liverpool must necessarily prove temporary. They have consequently acted with great caution, and have constantly argued that prices of goods and yarns would be lower as soon as the new American crop began to come forward freely. Here and there, fair orders have been given for particular staples at advanced limits, but, broadly speaking, it may be affirmed that the effort to raise prices at a distance has not been successful. Deliveries in execution of previous contracts have been going on steadily, but the replacing of expiring orders with new ones to follow on consecutively has been a slow and difficult process. The effect of recent reduced production ought to be perceptible in the exports to foreign markets during this and next month, and it is quite possible that the distributing markets may, towards the end of the year, begin to show a stronger appearance in consequence of lessened supplies. At present, however, there is very little sign of insufficiency in any direction.

WOOLLEN.—In the various branches of the woollen trade, a steady business has been done, full time being still the rule and, in many cases, overtime is being worked, and especially is this the rule among the makers of high class worsteds. These are still taking the lead as far as demand and paying rates are concerned, whilst good woollens are also selling fairly well. Cloths of a tweed character for the clothing trade have also met with much inquiry, and good orders have been given out, although there are complaints of the keenness of competition and lowness of prices; still, generally, manufacturers of this class of goods seem to make money, judging by the machinery that is being continually added to their mills. In mantle cloths of a figured character, there has been a fair demand, and this branch seems to be improving. There is little new to note in other branches. Manufacturers of many classes are now engaged making their patterns for next seasons, and the propects of a good trade in these are cheerful.

LINEN.—In this department, there have been decided symptoms of an improved trade. In the finer classes of table damasks, a better business has been apparent, and accumulated stocks have been lessened. In fine drills also a steady business may be reported, and the same may be said of domestic linens, such as tea and crumb cloths, towels, toilet covers, &c. In fact, with the exception of hand made linens, which seem to have met with little attention for some time past, the trade all round is in a healthier condition than it has been for months. Many complaints are made as to the small margin for profits but, in this respect, things have recently improved.

LACE.—This industry still remains dull, and although the strike is virtually over, still there are many hands out of employment. A moderate trade has ruled in plain nets, but at very low prices. The curtain branch, although fair sales have been reported, is by no means satisfactory, as large quantities of curtains could be made on machinery that is now idle, if the state of trade would warrant it. The only laces for which there is a fair demand are those with pointed edges and Valenciennes. Prices generally are low and unremunerative.

## New Patented Fabric, &c.

### FANCY PILED FABRICS.

This invention relates to the manufacture of cords, or other piled fabrics, in stripes of pile alternating with stripes of coloured fancy weaving. For the purposes of this invention, the warp is arranged either on two or more beams, or upon the same beam in stripes, the principal warp being grey or unbleached yarn, and those for the stripes are fast coloured, dyed yarns, such as will not be affected by subsequent bleaching, for instance, indigo blue or Turkey red. The weaving is carried out with a grey or unbleached weft, drawing in the warp and treading the "shed" in such a way as to produce an ornamental coloured stripe of fancy weaving with the coloured warp; and either a cord or a plain velvet "tie-up," with the grey warp between the coloured stripes. The pile of the grey stripes is then cut and raised in the ordinary manner, forming a grey cord or plain velvet, after which the fabric is bleached by any suitable process which will bleach the grey threads without affecting the indigo or Turkey red of the coloured threads, and the result is a novel kind of fancy piled fabric consisting of alternate stripes of white cord or plain velvet, and coloured stripes of fancy weaving, an effect which has never before been produced. In some cases, when weaving cords, this effect is varied by introducing coloured warp threads, also, in the ground or back only along the centre of each "float" or race, so that the coloured threads are entirely concealed by the floated weft threads in weaving, but, when the pile is cut and raised, the thin coloured lines become visible between the cords. The effect can also be varied by dyeing the whole fabric a light colour instead of bleaching, or after bleaching, and thus a light coloured cord, or pile and ground, instead of white alternating with fancy stripes of different or darker coloured yarn, is obtained.

### A NEW YARN.

A patent has been secured for the making of yarn or thread composed wholly, or chiefly, of fibrous or filamentous materials obtained from plants of the Callatropis Gigantea, which materials possess the strength necessary to bear the processes of preparing and spinning. The patentees state that, as far as their experiments have gone at present, they find that the said fibrous material alone does not possess the necessary cohesive properties to enable it to undergo the preparing process on the ordinary machinery now used in the manufacture of cotton yarn, they, therefore, propose to combine with the fibrous materials obtained from these plants a certain quantity of cotton, or other suitable fibre, which has been opened, and to feed the fibres together into a scutching or lap machine, in which they become thoroughly mixed and intermingled and formed into a lap, which is then fed into a carding engine, the cotton fibre among the other fibrous materials causing the whole mass of fibres to cohere sufficiently to form a web, which can be conducted from the doffer as usual, in the form of a sliver, for the subsequent operations of drawing and spinning. Yarn manufactured in this manner has the appearance and feel of silk yarn, or yarn in which silk predominates. As it may hereafter be found practicable to manufacture yarn entirely from the Callatropis Gigantea fibre, they claim the right of using such fibre alone, or in combination with cotton, wool or other fibre.

## Parcels Post.

CANADA.—The postage on parcels not exceeding 5 lbs. in weight, for each pound or fraction of a pound, for Canada, is reduced to the following rates:—To the whole of the Dominion of Canada, except British Columbia, including Vancouver's Island, 1s. 0½d.; to British Columbia, including Vancouver's Island, 1s. 3d. Parcels are despatched from Liverpool every Thursday morning. No parcel must exceed 2 feet in length, or 1 foot in breadth or depth.

SAMOA AND TONGA.—Parcels are now sent to Apia (Samoa) and Tongatabu (Tonga) viâ Germany. Parcels not more than 3 lbs, 4s. 0d. more than 3 lbs. but not exceeding 7 lbs. 4s. 6d. The regulations of the parcels post to Germany also apply to Samoa and Tonga.—*Board of Trade Journal.*

A new mill, called the Shandon Tweed Factory, was opened in June at Kyrls-Quay, Cork, by Mr. David O'Connell, and so much success has attended the enterprise that the proprietor is already turning his attention to an extension of the premises. We understand that Mr. O'Connell has spent a considerable time in the tweed districts of Scotland, having been born in Hawick, and has also been employed at the Caledon Mills, Tyrone, and at the well known works of Messrs. Martin Mahoney at Blarney. His machinery is of the latest description, the looms being Kirk and Crompton's fast running American patent. Anything tending to promote Irish industries should be welcomed by all well-wishers of the country, and, therefore, we hope every success may attend Mr. O'Connell's enterprise.

CURTAIN.

DRESS GOODS.

PANEL FOR DRESS GOODS.

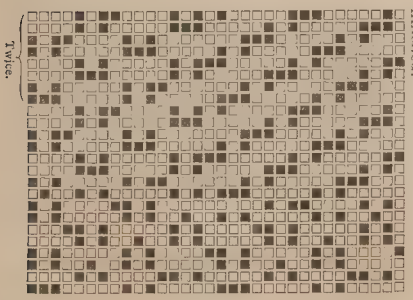
# FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

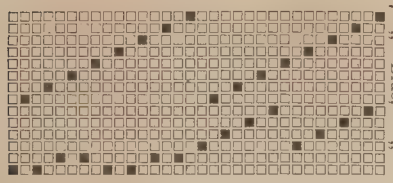
The specimens of fabrics made on Paget's Warp Weaver and Knitter, which we intended to give in this number, are again held over until next month.

## Worsted Suiting.

No. 605.



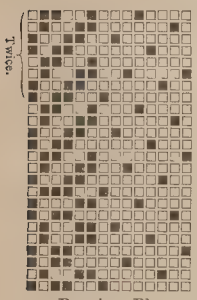

Design.



Draft.

7,168 ends in warp; 112 ends per inch; 14's reed, 8 ends in a reed; 54 picks per inch; 64 inches wide in loom; 56 inches wide when finished.

Worsted weft:—
1 pick Red, 2/30's.
8 picks Brown, „
8 „ Blue, „
8 „ Brown, „
7 „ Blue, „




Pegging Plan.

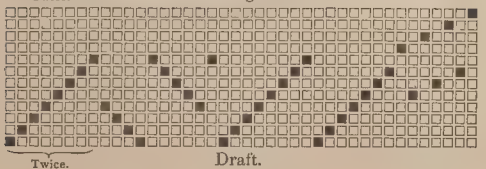
Ends Warp:—
1 Red, face.
1 Green, back.
1 Brown, face } 7
1 Green, back } times.
1 Black, face } 8
1 Black, back } times.
1 Brown, face } 8
1 Green, back } times.
1 Black, face } 8
1 Black, back } times.
Back and face all 2/32's worsted.

18½ oz. cloth.

## Worsted Trouserings.

No. 606.


Design.




Draft.

Pegging Plan.

Ends. Warp:—
16 Green, 2/28's worsted.
9 Twist, 2/30's „
15 Slate, 2/28's „
8 Brown, 2/28's „

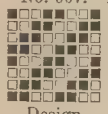
48 ends in pattern.

15 skeins woollen weft.

6,144 ends in warp; 96 ends per inch; 12's reed, 8 ends in a reed; 50 picks per inch; 64 inches wide in loom; 56 inches wide when finished. 24 ozs. per yard.

## Woollen Trousering.

No. 607. Ends. Warp:—



Design.

1 Fancy twist, 9 skeins.
3 Slate, „
1 Black and Brown twist, 9 skeins.
1 Brown.
1 White.
1 Brown.
1 White.
3 Dark Brown.
1 Brown.
1 White.
1 Brown.
1 White.

1,792 ends in warp; 28 ends per inch; 7's reed, 4 ends in a reed; 24 double picks per inch; 64 inches wide in loom; 56 inches when finished.

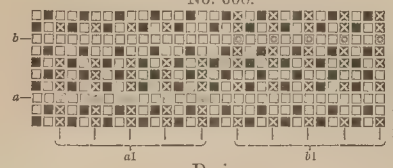
21 oz. cloth.

Weft:—20 skeins Black woollen.

16 ends in pattern.

## Mantle Cloth.

No. 608.



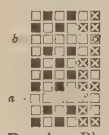

Design.

Lift all ⊠

⊠ shows pile threads over the respective wires.

Draft.

*a* short pile wire
*b* long „
*a*1 short pile threads
*b*1 long „




Pegging Plan.

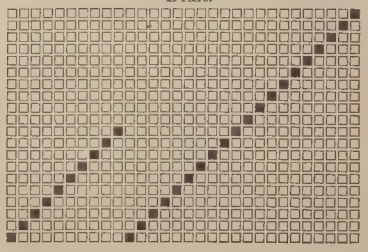
32 ends per inch; cotton warp 2/24's; cotton weft, 13's; 8's reed, 6 ends in a reed; 42 picks per inch; 33 inches wide in loom; 30 inches wide when finished.

Weight 9½ ozs. per yard, 36 inches × 30 inches.

## Cotton Dress Goods.

No. 609. Design.

Draft.



For the Pegging Plan take last 20 of the Design.

Lift White.

Warp and weft 2/36's; 45's sett; 50 picks per inch.

## Modifications in Customs Tariff.

NOTE.—Kilogramme = 2·204 lbs. avoirdupois. Peso Fuerte = 4s. 2d.

URUGUAY.—The Uruguayan Government has recently passed a law, altering the rates of Customs duty leviable on various goods imported into Uruguay, as follows :—

| Designation of Articles. | Rates of Duty now leviable. Pes. Cts. Kilog. (gross weight) |
|---|---|
| Hemp and cordages, tarred, hemp bleached, Manilla, &c. | ,, ,, 0·06 |
| Cassimere and cassinette of cotton | ,, (net weight) 0·28 |
| Fustian of every kind | ,, ,, 0·31 |
| Flannel or tartan :— | |
| Of wool | ,, ,, 0·75 |
| Of wool and cotton | ,, ,, 0·62 |
| Of cotton | ,, ,, 0·28 |
| Cotton ticking | ,, ,, 0·25 |
| Cotton tissues :— | |
| Pure, unbleached or bleached | ,, ,, 0·155 |
| Mixed, striped, &c. | ,, ,, 0·20 |
| Madras, calico, madapolam and cretonne | ,, ,, 0·25 |
| Cashmere and cassinette :— | |
| Of wool | ,, ,, 0·93 |
| Of wool and cotton | ,, ,, 0·31 |
| Iron :— | |
| In bars or plates, not wrought, girders, and rails | ,, ,, 0·01 |
| In plates, galvanised for roofs | ,, ,, 0·015 |

ITALY.—Small shawls of carded wool mixed with silk, sewn, having the hems crossed with woollen threads, dry-pressed and knotted, so as to produce the effect of a fringe.—Category 139. Duty, 300 lire per quintal, with addition of 50 per cent. for the sewing. Separate parts and accessories of boilers. The parts in question are classified as "manufactures according to the metal of which they are made."

UNITED STATES.—So called "worsted waste," being broken laps, is held to be scoured wool of Class I. imported in other than ordinary condition and dutiable at 60 cents. per pound. Carpet samples, or pieces about 1¼ yard in length, fit for use as mats or rugs, are to be classified for duty as carpeting under the provisions in T. I., 369, and in accordance with the Treasury Department's decision of February 1st, 1876 ; but when stabbed or cut to destroy their commercial value, may be admitted free. So called "New Zealand flax"—an article being neither flax nor hemp, nor allied botanically to either—is held to be dutiable by assimilation to sisal grass under T. 1., 333, at the rate of 15 dollars per ton. Tilbury (or driving) gloves, which are manufactured partly of cotton and partly of leather—leather, however, being the component material of chief value are dutiable at the rate of 50 per cent. *ad valorem*. Twilled lapping is dutiable as a manufacture composed wholly or in part of wool under T. I., 362. Cloths popularly known as coatings, suitings, &c., and so finished and close as to be specially adapted for use in the manufacture of garments worn by men and boys, composed wholly of wool, are dutiable under the provisions of paragraph 362, T. I., new, as a manufacture of wool, valued at less than 80 cents per pound, at the rate of 35 cents per pound and 35 per cent. *ad valorem*. Spooled linen thread is to be rated as free, under section 7 of the Act of March 3rd, 1883. So called "Dutch carpets" are properly dutiable at the rate of 12 cents per square yard. and 30 per cent. *ad valorem*.

TRINIDAD.—Textile manufactures of all kinds, wearing apparel of all kinds, haberdashery, for every £100 of value, £4; all other goods, wares, merchandise, and effects of every description not previously enumerated, for every £100 value, £4.

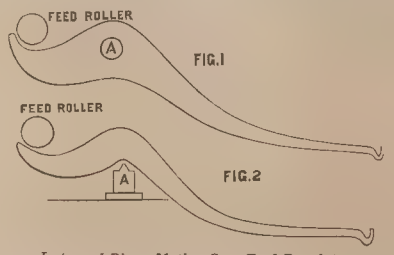
## Workmen's Wages in Germany.

The Chemnitz Chamber of Commerce has recently published an interesting report on the subject of workmen's wages in Germany. We commend this to the notice of working men in this country who occasionally fancy they are badly treated by masters, but we shall be sorry to see our artisans reduced to their level, either in the matter of wages or in length of hours employed, we would much rather find that the German workman had been raised to the British standard. In the Chemnitz district, the following rate of wages is paid:—Weavers of ticking, 6s. per week or 1s. a day; fustian weavers, 8s. per week or 1s. 4d. per day; sewers, 4s. 6d. per week or 9d. per day ; cotton sewers, the same ; corset makers, 10d. to 1s. per day ; linen and haberdashery, 10d. to 1s. per day. At Barmen and Elberfeld, the men weavers earn from 12s. to 15s. per week of 60 hours' work ; the women from 5s. to 8s. for the same length of time. In Saxony, the highest wages of the men is 2s. 5d. per day ; that of the women is 1s. 2d. In Silesia, the average falls to 1s. 2d per day. A few class of workmen are well treated, they are the engineers, the glass-cutters, and the makers of fancy wares at Berlin. But the engineers rarely earn more than 3s. 3d. or 4s. daily, and the workmen in glassware or porcelain about 2s. 9d. These figures show how German industry has been able to produce at such a cheap rate and to create for itself, in a few years, such a considerable export.

# MACHINERY, &c.

## Crighton and Sons' Improved Piano Pedal Motion Cone Feed Regulator.

In cotton spinning, the piano pedal motion cone feed regulator, applied to scutcher lap machines, plays an important part in the production of regular, even yarn, and such being the case, it is important that the movement of the pedals should be as sensitive as possible. In order to obtain this object, Messrs. Crighton and Sons, Castlefield Ironworks, Manchester, have recently introduced an important improvement in the regulator under notice. Hitherto, the pedals have worked upon a shaft marked A in Fig. 1. It will be obvious from this that, when the pedal is depressed by any irregularity in the feed of cotton, the friction arising from the pedal having to oscillate on the shaft A does not permit of free, sensitive action, and, thereby,

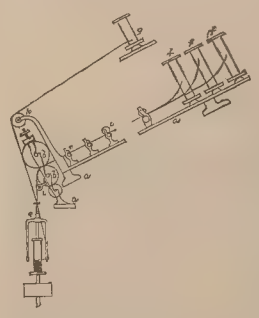



*Improved Piano Motion Cone Feed Regulator.*

retards in obtaining that for which it is applied, viz. :—to regulate. In order to overcome this defect, Messrs. Crighton and Sons have entirely dispensed with this shaft, and have substituted therefor a cast iron angular bar, marked A, Fig. 2, bolted to the scutcher frame sides, upon which the pedals are poised. This bar is planed to a true surface in its entire length, and the pedals to poise on the same are cut with the same accuracy, thus it will be patent to our readers that, when any irregular feeding causes the pedal to be depressed, the movement of the pedal is instantaneous and sensitive in the highest degree, and a real and true regulation of the feed of cotton is obtained, Another point to be gained by the adoption of this improvement is that the pedals and their adjustments can be easily taken to pieces and cleaned without much loss of time. We understand that, where these improved regulators have been applied, the greatest satisfaction is being given.

## Improved Mechanism for Making Union Yarns.

An improved method of, and apparatus for, the making of union yarns has been patented, the chief object being to produce a yarn, the interior or core of which is of a lower quality than the exterior. In manufacturing union yarns, the silk, or other covering, has generally been applied during the twisting or rotation of a yarn or core to be covered, the rotation of the core being depended upon for unwinding the covering material or yarn from the reel or bobbin upon which it was wound. Union yarns made according to this method are invariably tight and hard, and the core is often imperfectly covered, owing to the tension of the covering yarn at the time of its application to the core, and to the degree of tightness to which the core must be twisted before it can draw the covering yarn. The object of this invention is to produce union yarn which is soft and yielding, and the covering of which is well and evenly laid, and, to this end, mechanism is provided for positively feeding the covering yarn at any desirable speed. The accompanying drawing shows, in end elevation, part of a throstle-spinning machine, having mechanism suitable for carrying out the process. *a* is the frame of the machine, *b*, *b*¹ are the front rollers, *c*, *c* are drawing rollers, and *e* is a spindle, all being arranged in a well known manner. *f*, *f* are reels or bobbins, upon which the silk or other covering yarn (preferably in the form of rovings) is wound, the threads passing between the drawing rollers to the front

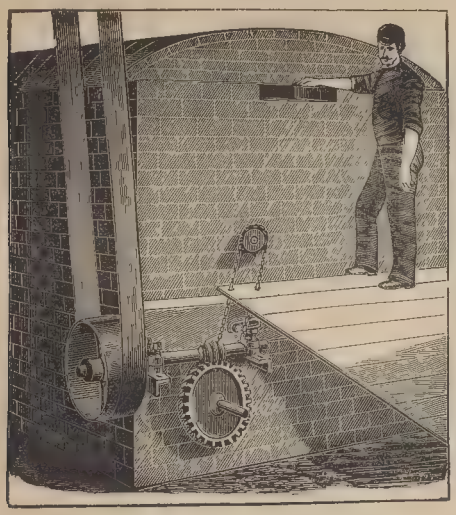


*Mechanism for Making Union Yarns.*

rollers which feed it forward to the spindle; *g* is a reel or bobbin upon which the core or yarn to be covered is wound, and *h* is an auxiliary roller for feeding the core forward to the spindle, where it unites with the covering yarn, the latter being twisted around the core during the rotation of the spindle. The auxiliary roller is driven at any required speed, according to the speed at which the core is to be fed forward. *i* is a small grooved roller which is placed adjacent to the front rollers, the bottom of the groove being over the centre of the spindle *e*. This roller serves for causing the covering yarn to pass to the spindle in a vertical direction. As the speed at which the core passes can be regulated by altering the speed of the auxiliary roller, and as the speed at which the covering yarn is delivered from the drawing rollers can be varied, it is obvious that any desired quantity of silk or other covering material can be laid upon a given length of core, to produce a union yarn of any required quality. In practice, the patentees prefer to employ a twisted yarn for the core, and, in applying the covering, to slightly untwist the said core, by winding on the said covering in the opposite direction to that in which the core is twisted, so that the natural tendency of the core to retwist itself slightly untwists the covering yarn, which thus lies lightly, yet tenaciously, upon the core. Although the improvements are described as applied to a throstle-spinning machine, they are equally applicable to roving, doubling, and twisting machines, and to mule spinning machines, working on what is known as the French system.

## Illingworth's Patent Carbonising Machine.

On two or three occasions we have given descriptions of patent carbonising machines that have been made by Mr. John Illingworth, flock manufacturer, of Whitelee, Batley, who has devoted much time and money to developing such mechanisms, and has, after numerous experiments, succeeded in producing a thoroughly practical apparatus which, in operation, is satisfactory in every respect. It is, now, a little more than five years since Mr. Illingworth patented his first machine, and, being a user of carbonisers in his own establishment, it is a matter of great importance to him that his work should be done as expeditiously and, at the same time, as efficiently as possible, he has, therefore, made frequent observations and

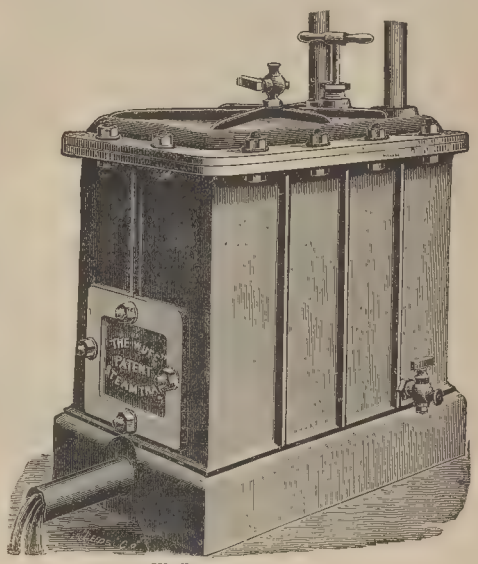


*Illingworth's Patent Carbonising Machine.*

experiments in order to improve the apparatus. During this time, he has taken out two other patents, but, before doing so, he built a number of machines, each of which was an improvement upon the former experiment, and now he is in a position to practically demonstrate that the one under notice is incomparably superior to any apparatus at present in use. In making his experiments, he found that the chief drawback, and main cause of defects, was to be found in having to open out and empty the machines, and refill them each time a charge of rags or other material was made. This operation, of course, set a quantity of gas at liberty, and this, in turn, proved an unbearable nuisance in the vicinity of the machine, and was also very injurious to the surrounding property. Another defect arising from the same cause was the admission of cold air, which lowered the temperature, and caused a great waste of gas by condensation, as the heat and gas had to be brought up to the proper standard again before the material next to be acted upon could be thoroughly carbonised, but the most serious defect was the necessity of the workman having to open out, empty, and refill the machine in the midst of an intense heat and a deadly gas. The patentee having all these faults before him, and being fully impressed with the importance of the matter, besides which he had numbers of inquiries from users in this country, the Continent, and America, for a better apparatus, went thoroughly into the subject, and has succeeded in producing an automatic apparatus which entirely obviates the defects above named. The principle of the machine is automatic throughout—in the feed, in the internal working, and in the delivery of the material. All the working parts have been constructed in such a manner that their simplicity prevents their easily getting out of order, and, at the same time, in case of accident, any part is easy of access, and when needful, can be removed and replaced with little delay and expense. The whole of the machine is enclosed in a brickwork chamber, this having a decided effect in keeping in the heat and preventing the temperature from going lower than is required, whilst, at the same time, it does not allow any loss by condensation of gas. The waste heat from the retort is utilised for raising and keeping up the heat. In working the apparatus, the rags, waste, wool, or any other material to be carbonised, are put into a hopper at the top of the machine, they are then carried forward in a regular manner through the length of the apparatus, the time taken in this operation being exactly sufficient to carbonise the material effectually. There is no irregularity in feeding, the operation being performed by a positive motion, so that the person in attendance cannot overcharge. We have had a number of opportunities of seeing the machine at work during the past few months, we can, therefore, speak highly of its capabilities in every respect. Its capacity for turning off work is large, as it is adapted to turn out a much greater quantity of material at much less cost than former machines made by Mr. Illingworth, and this is saying a great deal, when it is taken into account that the earlier ones made by him have proved to be the most efficient and economical in the trade. All particulars as to sizes and prices can be had of Mr. Illingworth, who will give every facility to intending purchasers to see the machine in operation.

## The "Wuff" Patent Adjustable Steam Trap and Dryer Combined.

This apparatus, which is being made by the "Wuff" Patent Steam Trap Company, Globe Road, Leeds, a description of which was given in our January issue, has been brought again under our notice as a combined steam trap and dryer. The apparatus, an outside view of which is given, has an addition to their ordinary steam trap of a second steam pipe in cover, and a suitable arrangement in the body of the trap for returning the steam after the condensed water has been dashed out of it. It can also be used, if

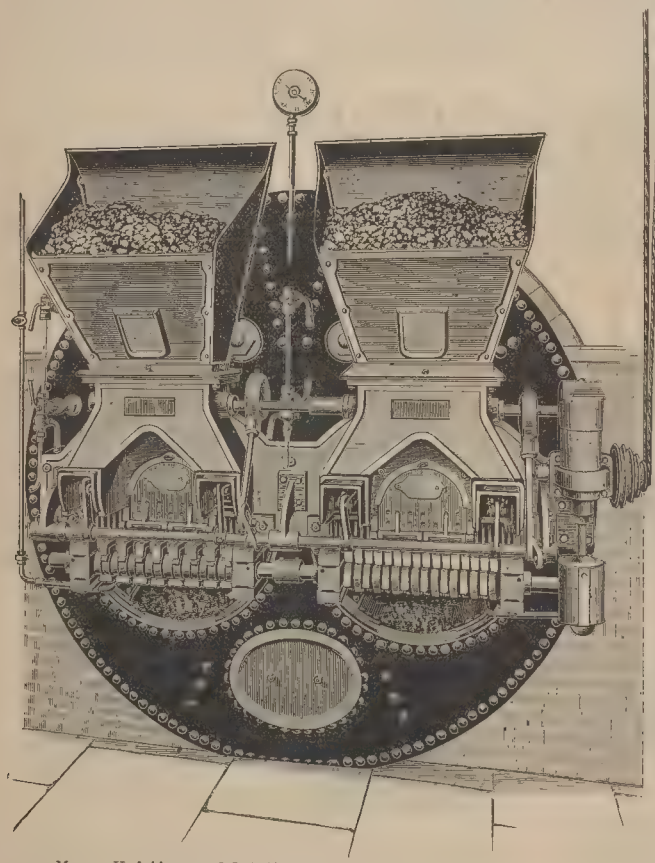


*Wuff Patent Steam Trap.*

so ordered, with two inlets in place of the return steam pipe. In this case, both inlets work at, as far as possible, the same pressure. The working of the trap, however, is entirely independent of the steam pressure in the body, it being "equilibrium." The inlet can be made in the end of the body of the trap, if so desired, or it can be arranged to suit any particular requirement. The steam, in passing through this apparatus, is thoroughly freed from its water, it is then returned for whatever purpose it may be required; the water is collected and deposited in the lower part of the vessel, from which it is automatically ejected by a perfectly simple arrangement, requiring no attention whatever. And, if the hot water is wanted for any purpose, it can be raised overhead into a tank for feeding the boiler, or it can be simply allowed to go to waste. No steam can possibly escape with the water. These steam traps and dryers combined are guaranteed to be perfectly durable and efficient, and can be used under the most trying and varied circumstances; they can be universally applied, and are specially advantageous in vacuum pans, also where steam is used for heating, and in all cases where boiling takes place, it being desirable to use the steam to its full extent. A perfectly automatic steam trap, suitable for varying pressures, and one that will not pass any live steam, and yet, on the other hand, will most efficiently take all the water from the pipes, coils, &c., has long been required; all these advantages are claimed for this trap, and those interested should give it a trial.

## Coal Bills and Smoke Nuisance.

The increase in the price of coal has been so considerable lately, and the prosecution for smoke nuisance so stringent, that manufacturers have felt it necessary to turn their attention once more to mechanical stoking, as a means for reducing their coal bills and, at the same time, abating the smoke nuisance. Various types of mechanical stokers have been tried in the past by different mill owners, but, although some of them have gained prizes at Exhibitions, and have been fairly successful, many of them do not fully come up to the requirements of the manufacturer. What is required in a mechanical stoker is a simple contrivance, not likely to need repairs, that fulfuls all the conditions of continuous, perfect combustion, combined with means for easy management. It should evolve the hydro-carbon gases in front of the furnace, thus enabling them to be consumed or burnt while passing over a bright, hot fire further back, through uniting with any surplus oxygen at high temperature, which they may encounter. With this object, the coke and cinders should be gradually carried towards the back, sufficient time being allowed to complete combustion and gradually



*Messrs. Hodgkinson and Co.'s New Smokeless Coking Stoker.*

resolve them into carbonic acid, ash, and clinker. The temperature should constantly remain at its highest, and the furnace doors should be kept shut, avoiding the inrush of great volumes of cold air, which chill and strain the whole boiler. At the same time, a door of ample size should exist to permit hand firing at any moment when needed. These requirements appear to have been met in the mechanical stoker which we illustrate, and which has been adopted by the East London Waterworks, and by some of the largest spinners, bleachers, &c., in Lancashire and Yorkshire, amongst others by the well-known firm of Messrs. Lister and Co., of Manningham Mills, Bradford. The illustration of the machine gives an idea of complication, which, in reality, does not exist, for all the parts are as strong and simple as it is possible to conceive them. The coal passes from the usual hoppers into shoots leading to each side of the flue, and is pushed, by means of rams, actuated by an eccentric and lever, into peculiarly shaped, but very strong, coking boxes, so arranged as to drop the coal on to a coking plate in continuous measured quantities, and from thence on to the fire bars. Instead of complicated mechanism, taking up much room, interfering with the cleaning out, and preventing firing by hand in case of emergencies, or early in the morning before the engine starts, there is only one revolving shaft, making one revolution per minute. The machine is driven by a single band, and all working parts are very simple and external to the boiler. The fire bars are very strong, and the motion imparted to them, which carries the coal gradually to the back, is most ingenious. The bars are drawn out alternately, and afterwards pushed back together in a row, and the coal thus gradually carried forward drops at last into a pit at the back of the fire bars in front of the bridge, where any residuary heat left in the coal or clinker is utilized. As a natural consequence, the gases evolved during the coking process, passing over a bright hot fire, are entirely consumed, and thus prevent all smoke from the chimney. The fire bars are self-clearing, carrying the clinker to the back, and dropping it into the pit, so that the fire is always bright, and no time is lost with cleaning and raking out the clinker through the door. This greatly reduces the labour of the firemen, and must of necessity produce a considerable economy, the fire doors remaining shut all the time. A peep hole is provided in the door for watching the state of the fire. This door is as large as in hand-fired boilers, hand-firing can, therefore, at any moment, be resorted to, and steam can be got up in the morning without removing any portion of the machine. The driving arrangement is of great strength and simplicity, and completely covered in, so that no coal dust can get at it. Occupying much less space than some other coking stokers, which almost completely hide the boiler, the latter remains quite as easily get-at-able for cleaning out and repairs as if it were fired by hand. Seeing that this new stoker is very simple, with no parts likely to get out of order, that it occupies little space, and does not interfere with hand-firing or cleaning of the boiler, that it reduces the labour, and effects a considerable saving in coal, while it prevents smoke, and that it, moreover, is of moderate cost, which will be saved in a very short time—it seems to us that it is likely to find favour with millowners. The makers, Messrs. Hodgkinson and Co., Limited, Manchester, whose well-known sprinkling stoker, in combination with forced draught, we described recently, have brought out this new smokeless coking stoker, in order to provide a machine that overcomes all previous defects of the coking system. They will be glad to give all further information.

## New Machine Works.

Messrs. John Sutcliffe and Son, Machine Makers, Halifax, have removed from Jail Lane to other premises at New Bank. The new works are large, lofty and commodious, and are in every way specially adapted for the making of high class machinery, such as is produced by Messrs. John Sutcliffe and Son. The firm make a speciality of rising and falling top saw benches, and machines for planing wood out of twist and thicknessing combined. This machine planes wood out of twist, over the cutters from 1-16th to 7½ inches full width of the machine. All other kinds of wood working machinery, on the latest improved principle, are made by the firm. Manufacturers requiring any machine of this class in their mechanics' shops should send for particulars to the above address.

It is stated that a Mr. E. Blass, a German scientist, has used the incandescent lamp for actual inspection of the inside of boilers under steam. A thick black tube was introduced through a stuffing box, a small incandescent lamp was lowered into this, and lighted by means of a battery. The whole of the boiler was thus lighted up, and could be inspected through a thick glass plate inserted in the boiler. The idea of employing electricity for this purpose is, we believe, not a new one. It is one, however, which might be usefully adopted in many instances to show the action of the water when the boiler is under steam, and to enable the steam user to provide a remedy in cases where boilers primed badly, either from being too small for the work they have to do, or from bad construction; it might also be used for investigating the effects of incrustation, &c.

A writer in "The Mining World" says:—"Slate is not a safe material for mill roofs. Not long ago, I saw a slate-roofed mill fired by heat from an adjoining burning building. The heat cracked the slates, and they ran off the roof in a shower, leaving dry wood exposed to the flames. Another building covered with shingles was equally exposed, and, singularly, the roof of the slate-covered mill took fire before the roof of the shingle-covered building. The streams of water turned on the slates after they became hot caused their rapid destruction, while the wetted shingles were kept from burning. The slate roof allowed streams of water to drip downward through the entire building, while the shingle roof protected the building which it covered. Slate roofs may prevent fires resulting from floating sparks, and shingle roofs, when very dry, may invite fires from such sparks, but, where buildings are crowded closely together, almost any one of the roofing materials is better and safer than slate, because, in the case of crowded buildings, the slate is exposed to heat sufficient to break it and uncover the roof.

## The Proposed Silk Exhibition, 1890.

At the annual meeting of the Silk Association of Great Britain and Ireland, it was finally resolved to arrange for an Exhibition of the Silk Manufactures of the United Kingdom, to be held in London, in the spring of next year, and an influential committee, consisting of the following gentlemen, was formed to make the necessary arrangements:—Mr. W. Anderson, vice-president; Sir G. Birdwood, M.D., LL.D., K.C.I.E., C.I.E.; Mr. J. Cash, President of the Chamber of Commerce, Coventry; Mr. E. W. Cox; Mr. C. Purdon-Clarke, C.I.E., Indian Museum, South Kensington; Mr. F. Debenham, vice-president, London; Mr. W. R. Fox, London; Mr. J. H. Donaldson, London; Mr. G. Holme, Derby; Mr. A. J. Lewis, London; Sir J. C. Lee, vice-president, Manchester; Sir J. Linton, London; Mr. G. J. S. Lock, hon. sec.; Mr. M. Makower, London; Sir P. Magnus, City and Guilds of London Institute; Mr. J. D. Milne, Manchester; Mr. J. O. Nicholson, President of the Chamber of Commerce, Macclesfield; Sir P. Cunliffe-Owen, K.C.B., K.C.M.G., C.I.E, South Kensington Museum; Mr. T. Pim, junr., vice-president, Dublin; Mr. H. C. Soper, London; Mr. T. Wardle, Leek; Mr. B. Warner, London; Mr. H. T. Wood, M.A., Secretary, Society of Arts, London; Mr. L. A. Walters, London; with power to add to the number. In order to place before the public the capabilities of the home industry for supplying its requirements, it has been decided that the Exhibition shall contain specimens of various branches, consisting, among others, of broad and narrow silk fabrics of all descriptions, including poplins, &c., also lace, embroidery, silk hosiery, costumes, fans, trimmings, sewing and embroidery silks, twists, cords, &c.; thrown silks, Indian and British Colonial raw silks, &c.; exhibits illustrative of the growth of silk, of the processes of manufacture, and of the printing, dyeing, and finishing of silk; various silk handicrafts in operation; industrial and decorative design as applied to silk fabrics. The committee are now seeking the co-operation of manufacturers and others, and we understand that they have already received an encouraging amount of support, and a further and more definite announcement may, therefore, be looked for shortly. The following ladies will probably form a committee to help to make the Exhibition a success, as soon as the nature and scope of the Exhibition are fully determined, and also the names of exhibitors ascertained:—Her Royal Highness the Princess Mary Adelaide, Duchess of Teck, president; Her Grace the Duchess of Abercorn, the Right Hon. the Baroness Burdett-Coutts, the Right Hon. the Lady Egerton of Tatton (hon. secretary, who will take the chair at all meetings), the Right Hon. the Lady Arthur Hill, the Right Hon. the Lady Knutsford, the Right Hon. the Countess of Lathom, the Hon. Mrs. Percy Mitford, the Right Hon. the Lady Rothschild, the Right Hon. the Countess Spencer, the Right Hon. the Lady Wantage, the Right Hon. the Countess of Wharncliffe, with power to add to the number. Lord Egerton of Tatton has kindly offered the following prizes:—First, £10 for the best design suitable for silk fabrics; and a second prize of £5, open to students of schools of art in the United Kingdom. It is expected that other prizes will be offered. The Secretary of the Association is Mr. A. E. Piggott, F.A.I., 22, High Street, Manchester.

## Paris Exhibition.

A list of the awards of the International Juries to the exhibitors in the British Section of the Paris Universal Exhibition has been issued, from which we extract such as will be of special interest to readers of a textile journal. In the Industrial Section there are 29 grand prizes, 184 gold medals, 243 silver, and 179 bronze. Amongst those who are to be recipients of the grand prize, we may mention Galloways, Limited, Manchester; G. Hodgson and Sons, Bradford; and J. Crossley and Sons, Halifax. Amongst those who have gained the gold medal are Barlow and Jones, Bolton; John Dewhurst and Sons, Skipton; Lister and Co., Limited, Manningham; J. Foster and Sons, Queensbury; Sir Titus Salt, Bart., Sons and Co., Saltaire; Lee Spinning Co., Manchester; J. Bright Brothers, Rochdale; Marling and Co., Limited, Stroud; Norwich Crape Co., Norwich; Swainson, Birley and Co., Preston; York Flax Spinning Co., Belfast; Renshaw and Co., Limited, Manchester; T. Bradford and Co., Manchester (gold and silver); A. Paget, Loughborough; Greenwood and Batley and Leeds Forge Co., Leeds; Crossley Brothers, Limited, Manchester; Tatham and Ellis, Nottingham; L. Sterne and Co., Glasgow. The following firms have been awarded silver medals—J. Carter and Co., Halifax; C. G. Hill and Co., and W. Lockwood, Nottingham; J. Johnson, Son, Allsop and Co., Bolton; Apperley, Curtis and Co., Stroud; Garvie and Deas, Perth; Robinson and Cleaver, Belfast; Hollins and Co., Nottingham; Island Spinning Co., Lisburn; M. Nairn and Co., and Barry, Ostlere, and Co., of Kircaldy; Neilson, Shaw and Macgregor, Glasgow; Dee Oil Co., Limited (two medals); J. Hattersley and Sons, Leeds; Chubb and Sons, Manchester (and bronze); Wilson Brothers, Todmorden; Gandy Belt Manufacturing Co., Liverpool; and Harrison's Patent Knitting Machine Co.; and bronze medals have been awarded to Armitage Brothers, and Rylands and Sons, Limited, Manchester; Hunt and Winterbotham, Stroud; Thorp and Sons, Huddersfield; Porter and Co., Paisley; F. Hind and Sons, Norwich; Donegal Industrial Fund; Mitcham Linoleum Floor Cloth Co.; Singer and Co., London, &c.; Reddaway and Co., Manchester; Blackmann Ventilating Co., London; and Thwaites Brothers, Bradford.

## Book Notices.

### The Trimming and Finishing of Hosiery and Hosiery Fabrics.

By J. H. Quilter. *Bradford:* Charles Greening.

In offering this book to those interested in the hosiery trades, the author explains that his object is to provide for the use of technical students, in a handy form, a series of articles which appeared in the *Hosiery and Lace Trades' Review*. At the same time he has added a collection of formulas and receipts of practical interest to those concerned with the trade. These include:—Finding the contents of tanks, ascertaining the speed of machines, shafts, &c.; also ascertaining the size required of driving or driven wheels; removing inks, oils, and other stains from fabrics; action of acids, and of alkalies; testing soap, and making soap; belt management; useful calculations, &c. The articles treat upon the duties and responsibilities of managers; tacking, scouring, milling, bleaching and stoving, &c. The book will be invaluable to, and should be possessed by, all interested in the hosiery trades.

### Weaving Calculations, by C. P. Brooks, The Mount, Blackburn.

*London:* E. and F. N. Spon, 125, Strand.

We have been favoured with a copy of this book, which has been written by one well qualified to deal with the subject of cotton manufacture in all its branches, the author being Senior Honours Medallist Cotton Manufacturing, 1887, and late Lecturer on Cotton Spinning, Weaving, and Designing, at the Blackburn Technical Schools. The book deals exhaustively with the subject of calculations necessary in cotton manufacturing, including those for cloth, yarn, winding, warping, and sizing, heald and reed, beaming, speed and gearing, slashing and taping; also loom, engine, boiler, shafting, and speed calculations, and those connected with the subject of wages. There are also mensuration calculations, and arithmetical rules and explanations; answers to city and guilds examination questions, and general textile information. We can recommend technical students, and others who require to become possessed of good useful information, to purchase this book on weaving calculations, with the full assurance that they will make a good investment.

## Odds and Ends.

The Central Association of German Manufacturers, in conjunction with the Association for the Protection of the Interest of Trade and Industry, Berlin, and the Association for the Protection of Economical Interests for Rhineland and Westphalia, Dusseldorf, have sent a commission to England for the purpose of examining the condition of the English working classes, with reference to the recent proceedings in the German working community. The commission is composed of the following gentlemen:—Mr. Möller, factory owner, Brackwede; Mr. Bueck, Manager of the Central Association, Berlin, and Mr. Beumer, General Secretary, Dusseldorf.

* * * * *

Some experiments have been made at the Wingate Grange Colllery to test the mechanical stokers made by Mr. Thomas Henderson, of Castle Street, Liverpool, with a view to fitting them to a range of Lancashire boilers. The coal used was weighed, and also the ashes therefrom, and a Sieman's meter adapted for hot water was used to ascertain the quantity of water evaporated. Three tests were made, lasting 48 hours, to compare the evaporation by rough-small and duff coal under the old system of hand feeding. The experiments were then repeated on the same Lancashire boiler, fitted with the mechanical stoker and self-cleaning bars. With rough-small coal, the duty was found to be increased to 33·3 per cent., and with duff to 35·9 per cent., showing a highly satisfactory result in favour of the mechanical stoker.

* * * *

A discovery has just been made near Dubbo, New South Wales, of a mineral which, by analysis, has proved to contain all the properties of the very finest sienna, and which experts, who have tested it in every way, have found to be suitable for painting, staining, dyeing, and for ink purposes. It is estimated that on the surface alone 20,000 tons of mineral is in sight, and as a shaft has been sunk to thirty feet, and the mineral improves in quality at that depth, there is evidently an inexhaustible paint mine. The mineral covers some 120 acres of ground, and can be mined and landed in Sydney for less than 25s. per ton from the mine. It is found in two colours—yellow and red. One peculiarity about the mineral is that either of the colours is ready for use immediately it is taken from the ground, requires little or no grinding, is entirely free from grit and dirt, and is, in fact, a pure colour, and may be used in oil, water, spirit, or as a dry colour. As the mineral can be put on the English, the American, and the Continental markets at one half the price of any such painter's material, there are reasons for anticipating that it should prove a financial success.

# PATENTS.

## Applications for Letters Patent.

Adjusting position of thread plates in wet spinning frames. W. Hyde, Belfast. 28th Aug. 13,587
Bearings (adjustable) for flats of carding engines. H. Monie and S. M. Rutnagur, Manchester. 28th Aug. 13,568
Backing-off cones of self-acting mules or twiners. J. Moorhouse and J. Ashton, Manchester. 31st Aug. 13,736
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## Patents Sealed.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8,852 | 9,372 | 9,578 | 10,228 | 11,590 | 11,636 | 11,812 | 11,928 |
| 11,938 | 11,947 | 11,973 | 11,975 | 11,981 | 11,996 | 12,035 | 12,203 |
| 12,430 | 13,885 | 14,349 | 17,395 | 2,065 | 2,791 | 8,220 | 8,260 |
| 9,324 | 10,218 | 10,805 | 11,062 | 12,298 | 12,485 | 12,725 | 12,993 |
| 13,006 | 13,143 | 13,253 | 13,368 | 15,001 | 17,617 | 18,202 | 11,801 |
| 12,368 | 12,528 | 12,591 | 12,611 | 2,339 | 9,537 | 11,639 | 12,125 |
| 12,166 | 12,662 | 13,086 | 13,175 | 16,240 | 17,834 | 4,071 | 4,120 |
| 6,774 | 9,521 | 9,526 | 9,649 | | | | |

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# The Journal of Fabrics AND Textile Industries.

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## Contents.



## Notices.


The Yearly Subscription—payable in advance—including home postage, is 10s. Cheques and Post Office-Orders to be made payable to H. & R. T. LOAD, 10, Ann Place, Little Horton Lane, Bradford, Yorkshire.

The Publishers will be happy to receive intimations of New Inventions, Patents, &c.

The Publishers are open to receive, from Designers, Original Designs of Carpets, Damasks, Tapestries, Linen, Cretonnes, &c., and such as are accepted will be published with the Designer's name affixed. All Designs sent for approval must be 10 inches long by 7 inches wide for single page, and for double page, 16 inches by 10 inches, and must be accompanied by Postage Stamps sufficient to pay return Postage in case they are rejected.

Literary communications must, in all cases, be accompanied by the names and addresses of the writers, not necessarily for publication, but as evidence of authenticity.

Authors are requested to retain copies of their manuscripts; rejected manuscripts cannot be returned.

To prevent any misunderstanding, all Articles sent to the *Journal of Fabrics and Textile Industries* for publication will be considered as offered *gratuitously*, unless it is stated explicitly that remuneration is expected.

Readers are invited to forward items of interest to the Trades concerned.

The Proprietors will feel greatly obliged if any of their readers, in making enquiries of, or opening accounts with, Advertisers in this paper, will kindly mention the *Journal of Fabrics and Textile Industries* as the source from whence they obtained their information.


## Specially Interesting to Manufacturers.

THE Journal this month contains a column of Personal and Trade Notes, to which we beg to draw the attention of our Subscribers. We particularly invite manufacturers, machine makers, managers, designers, and others engaged in the textile trades, to forward us short items of news, either of a personal or trade character, which we shall be pleased to insert, of course, reserving the right to exclude anything which we may consider unsuitable for a column of this description. American Journals are generally more attractive than English ones, because those for whose benefit they are published appear to co-operate with the Editors in making them interesting. In the eight years during which our Journal has existed, we have endeavoured to provide an attractive and useful publication, and in this respect we have been successful, but we consider that, with a little assistance from our readers, some of that brightness, which distinguishes American journalism, might be infused into our pages, to the benefit of all concerned. Therefore, we once more hope to receive the co-operation of all engaged in the textile trades.

## More Designs for Ladies' Fabrics.

Wherever one looks, the tendency seems to be towards a further development in ornamental fabrics for dress materials, mantle cloths, &c., but whilst, in many cases, the best use is made of ornamental forms, some manufacturers are introducing what they may consider novelties, but which are chiefly noticeable, firstly for their quaintness, and secondly for their ugliness. As an instance of this, we may name a cloth that we have recently noticed which owed its figuring—we can hardly call it ornamentation—to the use of a rope some three quarter inch in diameter passing through a ring about four inches in diameter. The rope was perfectly straight, and the formation of the pattern was that of a stripe. The design may have a nautical tendency, but, for excessive ugliness, we have not seen anything to surpass it. However, this shows that there are buyers of anything, no matter how ugly or ridiculous it may be. Those, therefore, who turn their attention to novelties, which include pleasing forms, may be assured of orders, as such things must sell in preference to the kind of pattern mentioned. Designs for all classes of fabrics have always found a prominent place in our journal, and we have usually studied the requirements of the generality of our subscribers. For our present use, we have three patterns, a figured dress fabric, a figured reversible mantle cloth, and a figured leno dress fabric. The first one under notice is shown on our third plate. This may be used with one colour for the ground, and one for the figure, say two shades of mahogany. But two or three colours for the figure would be more pleasing. The following particulars would be suitable for the making of a good cloth, in two colours:—

### ALL WOOL DRESS FABRIC.

2,560 ends in the warp.
80 ends per inch. Warp:—All 2/72's Dark Mahogany worsted.
70 picks per inch. Weft:—All 50's Light Mahogany worsted.
26's reed, 3 ends in a reed. Figure formed by weft on a warp satin ground.
32 inches wide in the loom.
28 inches wide when finished.
Weight, 3½ ounces per yard.

Another very nice effect may be got by using the design for a three colour pattern.

### SILK AND WOOL DRESS FABRIC.

3,840 ends in the warp.
60 ends per inch, 2/60's worsted. Ground to be 2 and 2 twill.
60 ends per inch, 40/2 silk. Foliage of pattern to be formed by silk warp, and the flowers by worsted warp, or *vice versa*.
30's reed, 4 ends in a reed.
70 picks per inch, 60's worsted.
32 inches wide in the loom.
28 inches wide when finished.
Weight, 3½ ounces per yard.

The design for a figured reversible mantle cloth in two colours would look well in shades of grey, the darker for the ground, or with an indigo ground and Indian red, of a dark shade, for the figure. Other pleasing colours will easily suggest themselves to the users. The following particulars will be found suitable for the making of a good cloth.

Warp:—1 end Dark Grey, 2/60's worsted.
1 end Light Grey, 2/60's worsted.
Weft:—1 pick Dark Grey, 36's worsted.
1 pick Light Grey, 36's worsted.

7,168 ends in the warp; 112 ends per inch; 14's reed, 8 ends in a reed; 108 picks per inch; 64 inches wide in the loom; 56 inches wide when finished. Weight, 12 ounces.

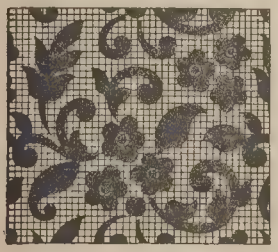
Another good cloth of a much heavier make, with the figure raised on the face and back, would be produced by the use of the following :—

Warp :—All Light Grey, 24 skeins woollen.
Weft :—1 pick Light Grey, 27 skeins woollen.
1 pick Dark Grey, 27 skeins woollen.

Woven, double weft face, 3 and 1 twill or satin.

2,048 ends in the warp; 32 ends per inch; 8's reed, 4 ends in a reed; 70 picks per inch; 66 inches wide in the loom; 56 inches wide when finished. Weight, 16 ounces.

Leno weaving has found, on various occasions, a place in our journal. In November last, we commenced a series of articles on this subject which appeared at intervals, and last month, these were followed by a design for Leno Dress Goods. We now give another of this character, but have made a departure from last month by not only showing an illustration of the design, but have also worked this out on ruled paper and shown it on our second separate plate, so that those who desire may produce the pattern with no further trouble than cutting the cards. To meet the varied requirements of our subscribers, this design has been prepared with a view to being produced in either a worsted or a cotton cloth, and all necessary particulars to make a good fabric in either of these yarns will be found below.



WORSTED LENO.

60 ends per inch, 2/80's worsted.
54 picks per inch, 2/80's worsted.
15's reed, 4 ends in a reed.
1,800 ends in warp.
30 inches wide in the loom.
Weight, 2·5 ounces per yard.

COTTON LENO.

80 ends per inch, 1/50's cotton.
70 picks per inch, 1/50's cotton.
20's reed, 4 ends in a reed.
2,400 ends in warp.
30 inches wide in the loom.
Weight, 1·5 ounces per yard.

For both worsted and cotton leno, two ends cross two ends. Lift all red and dots.

Leno weaving appears to be taking the attention of some other Textile Journals. The "Boston Journal of Commerce" has an article on this subject which we have reprinted here. The writer says :—

For the purpose of this article, I have selected the diamond weave, because that can be woven on an open shed or double-action loom without any special attachment. It will be understood, of course, that in this article the diamond weave is used simply for the ornamental stripes, the intermediate stripes being plain satin or whatever is desired. I shall pre-suppose that the intermediate stripes are provided for, and shall deal only with what is necessary for the diamond weave. It is drawn on a 5-harness, as in Fig. 1.

Note.—Let the horizontal lines represent the harness; the perpendicular lines, the thread; No. 1 is the doup, and No. 2 the standard or frame. The doups are knitted to Nos. 3 and 4, the threads that go over the doup or the dead harness; No. 5, the threads that go through the doup or the doup harness.

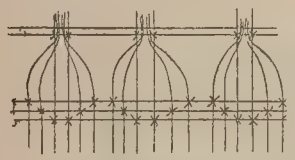


Fig. 1.

By comparing Fig 1 (diamond weave) with Fig. 2 (plain gauze), it will be seen that the principal points of difference are that in Fig. 2 the threads all cross from left to right, while in Fig. 1 the threads cross from left to right and right to left alternately. In plain gauze, the pattern is perfect on both sides, while, with the diamond weave, the pattern is on the face of the cloth. The doup thread should be coarser than the crossing threads, and the weave is such that the doup thread is thrown prominently on the face of the fabric. The two crossing threads in Fig. 1, instead of one in Fig. 2, are an important factor in making a handsome diamond. The two crossing threads form a plain weave back of the doup thread, making the figure show up better, and the doup thread, half twisting around two threads instead of one, causes it to spread further and to make a more perfect diamond. Fig. 3 is the chain draught for the diamond weave. In a fabric of this kind, it will be necessary to make some provision for the doup thread, as it will take up much faster than the crossing threads. To provide for this, the doup threads must be wound on a separate beam, while the crossing threads can usually be put on the same beam with the warp for the intermediate plain on satin stripes. In a fabric of this kind, there are no perforations between the picks of filling, where the doup threads half twist around its mate, because the doup thread does not enter into the construction of the groundwork of the fabric, but makes simply a raised diamond on a plain ground.

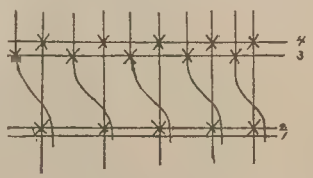



Fig. 2.

| | 1 | 2 | 3 | 4 | 5 |
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| 1 | ■ | ■ | □ | □ | □ |
| 2 | □ | □ | □ | ■ | □ |
| 3 | □ | □ | □ | ■ | □ |
| 4 | □ | □ | □ | ■ | ■ |
| 5 | ■ | □ | □ | □ | ■ |
| 6 | □ | □ | ■ | □ | □ |
| 7 | □ | □ | □ | ■ | □ |
| 8 | □ | □ | ■ | □ | □ |

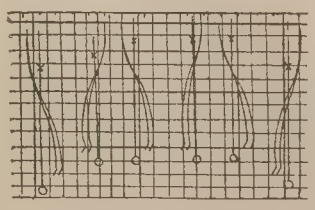
Fig. 3.

In a fabric where the gauze effect is desired, the doup thread forms one half the shed at every pick of the loom, so that, when the threads cross, they will separate the filling picks at least a distance equal to the diameters of the two threads. Having climbed the hill of patient explanation, let us see what lies in the valley beyond; let us see if we can tell why the pattern under consideration can be woven on an open shed loom, while a plain gauze cannot. The diamond weave being only a single individual of a large family of patterns, it gives the key to the whole situation. If we can pass this Gibraltar in safety, we are fairly launched on the great ocean of fancy weaving, and can sail thence to any port we please.

It must be borne in mind that the half twist, which is the distinctive characteristic of gauze, can only be made under one condition, viz. :—that the harness concerned in the operation is brought to a common level at the time the doup thread crosses its mate. This common level in the case of the diamond weave is at the lowest point in the shed. We are enabled to utilize this lowest point by reason of the fact that in the pattern, Fig. 3, there are three picks between the falling and the rising of the doup thread. In plain ganze, these intermediate picks are absent, and for this reason the diamond weave can be woven on an open shed loom without special attachments, while the plain gauze cannot.

The sample below is another variety of pattern, used a great deal in connection with satin stripes and checks, and is made by using a cord in place of the two threads drawn through the doup. (It will be understood that I am dealing only with the leno stripe). In the gauze, the right and left tie will show to good advantage. The cord should be wound on a separate beam carrying a little less tension than that of the crossing threads. The cord should be larger than the two crossing threads taken together. The effect of the introduction of this cord with slackened tension will be to give us something which resembles the diamond weave, so that, instead of having a plain gauze to offset the plain spot (I say plain gauze because the effect is nearly the same as that of the plain gauze weave), we have something which not only produces the gauze effect, but also adds beauty and elegance to the design, making this part of the pattern to stand out with a character and distinctiveness of its own. It is no longer subordinate to the plain spot, but it catches the eye first and makes the plain spot play second fiddle, as it were, where formerly it had acted as master of ceremonies and marched at the head of the procession. By comparing this weave with that which appeared under the head of "diamond weave," it will be seen that there is a resemblance without a likeness; a resemblance because we get in this something the same effect as in the diamond weave, but they are not alike, because the effect is obtained in a different way in this pattern—by the cord in conjunction with the right and left tie, which, entering into the construction of the ground-work of the fabric, produces the gauze effect not obtained in the diamond weave.

SAMPLE.



DRAWING IN DRAUGHT.

These two varieties of the weave under consideration are used on two distinct styles of goods. The first being suitable for light-weight goods. Goods having a plain stripe in connection with this weave will present a well balanced appearance, but where it is desirable to have the leno stripe to show up, the variety presented in this article will secure it, if care be taken in the selection of the size of cord. A combination of this kind, however, is not conducive to that symmetry and harmony that pleases the eye of the critical designer. The styles of goods to which this latter variety is best adapted are those which present a heavy appearance. Combination of satin stripes, checks, or satin and plain stripes, can be used with this variety of weave with good effect. If the combination be satin and plain stripes, the cord should not be quite so heavy as where there is no plain. This weave is used largely on jacquard patterns with figured satin stripes, as shown in the accompanying design. Such stripes have rather a heavy appearance, and, therefore, their combination with this weave produces a well balanced and symmetrical pattern. Upon the proper adjustment of the various parts of a piece of goods mainly depends its success either in an

artistic or commercial sense. It is not enough that each individual part should be neat and desirable, but they must be properly combined.

REED PIAN.

2 threads x 1 cord in 1 dent.

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In rude countries, people yoke mules with oxen, and dogs with women, but the designer who attempts any such monstrosity is not a desirable factor in the manufacture of saleable goods. A wart on a man's nose, or a well on the top of his head, is a no more offensive spectacle than a badly adjusted and ill assorted pattern. The good judgment that combines a pattern is fully as essential as the ingenuity and originality that contrives its several parts.

## Difficulties in Fulling.

### COCKLES.

In writing upon such a subject as the fulling of woollen goods, how much more pleasant would it be for both writer and reader if we could only go straight ahead and find our way plain and easy, and our path free from those troubles and annoyances which perplex the life of every finisher; but, in this operation more than in any other, we find to our sorrow that this is not the case. In fact, this operation is, when we come to look into it from a closer standpoint, just bristling with difficulties from beginning to end. It it so easily affected by outside circumstances that, many times when a trouble arises, we are at a loss to know just where to look for its cause. In fact, a rule which, to-day, gives the very best results on a certain piece of cloth, might, in a week, give a widely different result on an exactly similar piece, and, from all the finisher or fuller can see, there is no earthly reason why it should be so. It is such problems as these, and many more of a different nature, which the fuller and finisher are called upon to solve, and it is to these that we now wish to direct attention in the present paper. In the first place, we will look at the difficulty which, in the finisher's language, is known as "cockles," and which, when discovered, is too often laid to the charge of bad work at the fulling mills. At the outset, we must bear in mind that this is a trouble which may or may not be caused in the finishing department, but if we make an intelligent survey of the other departments of the mill, we shall soon be convinced that it is quite as often due to neglect before the cloth comes into the hands of the finisher. It remains, when cockles first show themselves, for the finisher to make prompt and accurate examination of the faulty goods, and from their peculiar appearance, to determine just where the cause of the mistake has been. Then action for the removal of the same may be governed accordingly. But it is the height of nonsense to try to avoid cockles in the finishing department, when they are produced long before the goods reach the finisher or his help. But from the simple fact that they usually make their appearance first in the finishing room, the finisher is often unjustly charged with their production, and he it is who is called upon to answer for them. We would advise that, when they do appear, the finisher decides beyond a peradventure where they have been caused, and fastens the blame beyond a doubt just where it belongs. But, if his is the responsibility, let him shoulder his trouble without a murmur, and at once set to remedying the evil if it is within his power. Since we have already spoken of the fact that cockles are often produced by neglect in the other parts of the mill, we will now look into this assertion a little more carefully, and try to see where and how such trouble sometimes arises. In the first place, cockles may be caused by uneven mixings of the wool, and they will be sure to appear also when random wools are used. Again, it is never right to mix waste with a lot after it has been started. It should only be used in a new lot, and then only in the proper proportions. Again, the picker tender should always take his supply of wool at right angles to the lot; if he do not, uneven carding and, consequently, uneven threads will result. And how could we expect anything but cockles from such a grade of yarns? Another point, when shoddy is used care must be taken in the mixing, or else cockles will result. So we might say, in the case of noils or other kinds of low stock, judgment, and care must be constantly brought into play or trouble will surely ensue. In the spinning room, we shall find frequent causes for cockles to appear. Uneven side threads, hot spools in the condensers, and spools mixed together, will cause unequal and imperfect yarns. If such yarn is used as filling, cockles must necessarily result, and, no matter what the fuller may do to prevent or cure them, his efforts will be in vain. Look now to the weave room, and here, likewise, we shall find that our assertions still hold true, cockles which are made in the looms may be caused in the let-off, and, occasionally, an uneven piece of goods is made by the shed not opening well. Variation in the number of picks, regular friction on the beams, a crooked beam, or filling not properly steamed, are each frequent and common causes of the evil in question. In fact, anything in any department of the mill which tends to any irregularity in weight, twist, stock, or condition of the filling, will bring about this same result. The most common of all cockles are those known as "bobbin cockles," which are caused by unevenness in the fillings. The effect of such is what might be called a "regular unevenness" at the stated intervals of one or two bobbin lengths. These effects are plainly visible when the goods are drawn over a perch and closely inspected between the examiner and the light of a large window. The above are only a few of the causes which meet in the formation of cockles, and, after their careful perusal, surely it would be unjust to always lay the blame of this difficulty at the door of the fuller or finisher, when there are so many chances of their production in the other parts of the mill. It would be safe to say, from our point of view at least that, in nine out of every ten cases of cockles, the real cause for the trouble existed long before the goods ever came into the hands of the fuller. Hence we feel justified in affirming that comparative freedom from blame should be accorded to the finisher, when there are so many other causes to which the effect may be due. It is, however, all important that it first be correctly determined what has been the real cause of the trouble, and then we can set about a definite and sensible means of preventing its appearance. But do not too hastily lay the blame of it all on the finisher, simply because he was the first one who discovered the existence of the evil. In case cockles are really due to some defect in the operations of finishing, then it would be well for the finisher to know where to expect such causes to exist and, since we have looked for a few minutes to the other departments of the mill, we will now turn attention to the finisher's domain. We may say, as a general truth, that cockles produced in the finishing room are usually due to some neglect in the preparation, or in the application, of the soap in the fulling process. As to preparation, for instance, if the soap is not strong enough to start all the grease, we may most reasonably expect that it will have its effect where it first strikes the piece. Then, of course, its alkaline strength will be completely lost long before the soap is evenly distributed over the whole length of the goods. Further, if the soap is so weak that it cannot possibly raise all the grease in the goods, its action must, of necessity, be imperfect and incomplete, and lead to a corresponding unevenness in the fulling of the cloth. This is reasonable enough, since the places first affected by the soap will naturally begin to full first, while those which receive the action of the soap last will just as surely begin to full after the former have been fulling for some length of time; and, if the goods are such as only require to full for a short time, this difference will cause a noticeable unevenness in the cloth, but, in case long fulling is required, the danger of cockles from this source is, to a great extent, overcome. Indeed, we may say that any condition of the soap which prevents its uniform and perfect action upon the goods must lead to this result, and although some deny that cockles can be produced in the fulling mills, yet we do not see how anyone can reasonably consider the above remarks without being convinced of the possibility, at least, of such being the case. Take now, the methods of application of the soap, and we shall see again how possible it is to produce cockles unless strict and positive care is exercised in every particular. The composition of the soap may be perfect, and its strength may be all that is required, and yet if it is so applied to the goods that its action is uneven and irregular, or one part of the piece runs under the action of the soap, while another part runs without that action, then we may most naturally look for cockles in our finished goods. Those parts of the cloth which, by the application of the soap, are wet first will naturally begin to full first, while those wet later on will not begin to full so quickly; but if, in the application of the soap, we are always careful to have it so regulated that all parts of the piece begin to full at the same time, then we may rest assured that there will be no trouble with cockles from this cause at least. Too little soap, weak soap, and soap improperly applied, all lead most naturally, under certain circumstances, to this same result. It is quite possible, again, to produce cockles by an improper application of the flocks. Occasionally, the flocks may be applied in such a way that it dries up the soap in blotches or spots on the surface of the goods. This must, of necessity, produce unevenness in fulling, provided the goods do not require to run a long time. Sometimes, again, when dry flocking is practised, it is possible for the goods to be wet in places from the soap remaining in the corners and sides of the mill from the last operation. Then, when the flock is applied before the regular soaping of the goods, these spots which have been irregularly wet, will, of course, start to full first, and hence become a possible cause of cockles. The characteristics of cockles which have had their rise in the fulling process is great irregularity, and, as a rule, the wrinkles will be longer at the centre of the piece than at either side. These few remarks go to show most conclusively that there are causes which may produce cockles in the finishing room, and, when they make their appearance, it would be well for the fuller to give more diligent attention to the few points mentioned above so as to escape, as much as possible, all blame in the matter of their production; but to say that cockles are never, and can never be, produced in the fulling mills, seems to us to be a rash statement which the experience of most finishers will hardly warrant. Another difficulty, which occasionally bothers the fuller, lies in the rolling or roping of the goods in the mills while in the process of fulling. The piece may have been started in the mill all right, the soap may have been applied in the most careful manner, and all else, so far as the fuller can see, is in the best condition, and yet, before the piece has been running very long, it is found to be so rolled and twisted that it is not only

impossible for it to felt but also to receive the flocks evenly throughout its length. The fuller may take it out, and, after untwisting and straightening, it will run for five minutes more, and then be in just as bad a condition as ever. This trouble may be due to more than one cause. If the mills are at fault, it may be that the friction rollers are out of true. This will sometimes lead to such a condition of affairs. They should then be taken out and turned down to their proper size again. When the top and bottom rollers are geared together, unless they are both of the same size, the goods are liable to be affected in the manner above described. If there is nothing found to be wrong in the construction or movement of the mills, we must look then to the weave of the goods, or to variations and unequal weights in the yarns. One of the most common sources of this trouble is tight selvages. Also, in goods which are woven with a backing, we may find the yarns coarser, and hence the picks woven in firmer and stronger on the back than on the face. Then the face would full faster than the back, and inevitably give rise to the trouble in question. A third difficulty with which the fuller often meets lies in allowing the temperature of the mills to run too high. The cause of this is evident. If the mill is kept closed, the constant generation of the heat must in time reach a maximum, and then the fibre is weakened and the colours destroyed. When the heat thus becomes too great, the fuller should regulate it by opening and closing the doors of the mills. He might find it a help to have a small thermometer hanging just inside the mill to aid him as a sure guide in not overheating his goods. And since the warmer it is, the faster the cloth fulls, the fuller may often be tempted to overheat his mills in the endeavour to turn off a larger amount of work. But here, as in so many other cases, quantity is only gained at the expense of quality. It will always be found hardest to full the first set in the morning, for the reason mentioned above, viz: —the mills have become entirely cooled by standing over night. Indeed, so marked in its effect is this one fact that it is possible to start two similar pieces in the same kind of mills at the same time, and yet one will full faster and better than the other, and, so far as an observer is concerned, with no possible reason for so doing. But on closer examination, we shall, very likely, find that one mill is in a cool corner of the room, or in a draught, or has an open window near by, any one of which causes would prevent the two operations from being exactly alike. The last difficulty which we shall note is tender goods. We only give this subject here a passing remark, as we hope, after having considered all the operations of finishing, to revert to it again, and to deal with it in a separate article. We would just say in behalf of the fuller that when goods are woven too light, and the weight is intended to be made up by shrinkage and by flocks at the mills, it is not right to lay all the blame upon the shoulders of the fuller, if such goods are turned out tender. If a piece has to full to its limit of shrinkage in order to reach its required weight per yard, we can understand that it is a very easy matter for the fuller to run the goods beyond this limit, and thus incur the risk of tender goods; for, after a fabric has once been fulled to its limit of shrinkage, all work after that point has been reached is but so much wear and tear on the life and durability of the fibre, and tender goods must inevitably result.—*Boston Journal of Commerce.*

## Purification of Waste Water in Dyeworks.

C. F. Göhring. Chem. Zeit. No. 52, 1889.

Many methods that have been proposed may, upon a small scale, lead to satisfactory results, but are not applicable where the mass of water amounts to thousands of cubic metres, on account of their proving too expensive. In the large establishment at Spindlersfeld-on-the-Spree, where the quantity of waste water amounts to about 10,000 cubic metres daily, all the waste waters of the dyeworks, bleach works, &c., are first collected in large basins, the greater part of the soap water having previously been decomposed, in a particular arrangement, for the purpose of regaining the fat. In these basins, the dark coloured, dirty waters, which have a slightly acid reaction, and an odour of the dyebaths, clear themselves mechanically of the coarser impurities, and separate, by a mutual reaction of the different waters, a small quantity of oxide of iron, tannin, and dyestuffs, salts of fatty acids, &c. If allowed to become stagnant, this water is inclined to the formation of fungi, and can, therefore, not be discharged into a public river, such as the Spree. The analysis of samples of this waste water taken daily showed on the average:—Temperature 20° C., colour bluish black, reaction acid, odour of dyewood extract. Suspended contents:—Tannate of iron, extractive substances, textile fibres, &c. After filtering, the water is brownish black, and contains, in 100,000 parts:—

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|---|---|---|---|
| Dry residue | 88·0 parts. | Oxide of iron and alumina | 12·67 parts. |
| Redheat residue | 53·0 ,, | Chlorine | 5.11 ,, |
| Redheat loss | 35·0 ,, | Nitric acid | 1·72 ,, |
| Lime | 6 52 ,, | Nitrous acid | None |
| Magnesia | 0·81 ,, | Ammonia | 0·23 ,, |
| Sulphuric acid | 12·67 ,, | | |

The original water is derived from the Spree and the Spindlersfeld springs. The purification of the waste water is effected in a pumping station, in which a centrifugal pump, with a system of wide tubes, pumps the water from large basins into a small mixing basin, while the coarser solid parts are retained in the large basins by grates. In the smaller basin, milk of lime and chloride of magnesium in solution are added in suitable quantities, the influx of these chemicals being controlled by the labourer managing the machine, according to the alteration of the composition of the waste water. From the mixing basin, the water is forced by the pump into a large clearing basin, where it mechanically clears itself of precipitates, and being purified further in a long course and in close contact with the oxygen of the air, filters through the ground or through a filter basin into the river in a condition which can leave no scruples, as appears from the following analysis:—Temperature 12° C, colour reddish clear, reaction neutral, odour none, suspended parts none. In 100,000 parts there were:—

| | | | |
|---|---|---|---|
| Dry residue | 66·01 parts. | Nitric acid | None |
| Redheat residue | 54·00 ,, | Nitrous acid | None |
| Redheat loss | 12·01 ,, | Ammonia | None |
| Lime | 15·72 ,, | Total hardness | 17·01 parts. |
| Magnesia | 1·04 ,, | Permanent | 16·80 ,, |
| Oxide of iron and alumina | 0·17 ,, | Temporal | 0·21 ,, |
| Sulphuric acid | 11·84 ,, | Ability of oxidising in permanganate | 9·72 ,, |
| Chlorine | 6.55 ,, | | |

A comparison of the analyses of the water before and after purification shows that a considerable part of the oxide of iron, and especially the dangerous organic substances, are diminished. The water is, besides, no longer favourable to the growth of fungi. The muddy products resulting from the process of purifying had the following composition:—Fatty mud—Sp. gr. 0·850; moisture, 10 per cent.; fatty acids, 53 per cent.; mineral constituents, 0·62 per cent.; besides mineral acids, tannin and dyestuffs, and textile fibres. The dried mud is left to lie for a length of time, and afterwards worked up in steam presses for the purpose of gaining the fat. Mud from the clearing basin, after being treated with lime and chloride and magnesium:—Colour, dark brown; moisture, 81 per cent.; combustible matter and volatile parts, 11·8 per cent.; ash, 7·2 per cent.; lime, 22·4 per cent.; magnesia, 10·3 per cent.; oxide of iron and alumina, 15·0 per cent. In variable quantities:—Silicic acid and alkalies, sulphuric acid, chlorine, dyes and extractive substances, textile fibres of all kinds, &c. This mud is chiefly a precipitate of oxide of iron, carbonates of the alkaline earths, besides organic matter. It is transferred from time to time to a distant ground to serve as manure. In the general exhibition for prevention of accidents in Berlin, the system of purification described may be seen at work on a smaller scale.—E. K.

## Cloths made upon Paget's Warp Weaving Machine without Weft.

In the three last issues of this Journal, a detailed description of the mechanism and capabilities of Paget's Warp Weaving Machine have been given, and this month, on our Supplement Sheet, will be found specimens of four fabrics woven upon this machine. Pattern No. 1 is a cloth made in 20's yarn, indigo dyed, and shrunk, the fabric being slightly raised. Either for ladies' or gentlemen's wear, the material will be found quite as serviceable as if the same yarns had been woven on an ordinary loom with warp and weft. We wish our readers to thoroughly understand that this and the patterns, Nos. 1, 2, 3, and 4, have been made entirely without any weft, the whole of the fabric being produced from a warp only. It will be noticed that the finish is equal to that of the general run of cloths, and, for "handle," it is all that could be desired. No. 2 is made from a similar count of a mixture yarn, but has been fulled, and, in consequence, appears a stouter cloth. The colouring is adapted for fabrics for ladies' wear, and for tight fitting jackets would be admirable. These cloths are samples of the plainer kinds of fabrics that can be produced by the machine, but stripes in varied colourings adapted for costumes, suitings, trouserings, can be woven in a great variety of yarns. No. 3 is a specimen of a material adapted for vests and such like apparel, being of natural wool yarns. In the making of this class of fabrics, the variety of patterns and mixtures that can be obtained is almost without limit; they can be woven in counts of yarns from the coarsest to the finest, in wool, silk, cotton, or any other fibre. As was stated in previous articles, fabrics can be made on the machine shaped ready for the wearer, as, for instance, an undervest is woven the shape required for the neck and shoulders, narrowed towards the waist, and gradually made broader towards the bottom, it is afterwards stitched up the side to complete the work. Sleeves are likewise shaped as required. No. 4 is a pattern of a towelling showing a piece of border. In the making of this class of fabric, there is undoubtedly a fine opening for the machine, as also for toilet covers, quilts, and such like materials, as the patterns that can be produced for these are endless, both in plain and coloured ideas. The whole of the patterns have been woven on the same machine, being made on 1,008 needles, and 84 inches in width, the width being divided into two cloths, each having a perfect selvage down each side. They have been made at the rate of 120 courses per minute, this is equal to a loom weaving a cloth 28 inches wide, 360 picks per minute. Of course, it is an impossibility for a loom to run at such a speed on these makes of fabrics. We may add that the machine is capable of producing blankets, flannels, and such materials in great variety. Any of our readers interested in the machine, and who have not seen the full particulars of its capabilities can, on application to Messrs. Paget and Co., Loughborough, or to The Paget Web Co., Victoria Chambers, Westminster, have a sight of it at work, and any particulars desired.

## Mr. Smith Feather, The Mayor of Bradford.

A gentleman connected with the great industry of the West Riding—the textile trade—once more has been chosen to fill the office of Mayor of the Borough of Bradford. The gentleman in question, whose portrait appears below, is Mr. Smith Feather, head of the firm of John Feather and Sons, top makers, Bradford, who is in every way well qualified to fulfil the various duties connected with the chief magistracy of an important town. He is a native of Vale Mill, Oakworth, near Keighley, and was born in 1837. His mother's family being connected with the stone trade, it is a matter of course that he should find employment in his earlier days in the same trade. This, however, does not appear to have been to his liking, for, after a few years, we find him joining his father in the business of a wool and waste dealer. This business speedily developed into that of wool combing, which has been carried on to the present day with much deserved success. To particularize the class of trade in which Mr. Feather is engaged, we may say that his operations extend over a very large area, as all kinds of tops are made by his firm, including those from Levantine, African, Russian, Persian, and South American wools, as well as those from Chinese and Russian camel's hair. For collecting these wools, they employ agents who attend all the markets of Asiatic Russia, as well as those on the western side of the Ural Mountains, including the famous fair of Nijni-Novgorod on the Volga. China camel's hair is mostly shipped from Shanghai. The method of shipment which used to be employed may be of interest. The hair was plaited into rolls similar to a Chinaman's pig-tail, the plaits being some six or seven feet long, and two inches thick. About a dozen of these were packed into a square mass, and around this was wrapped other plaited hair which made a block six or seven feet long and about a foot square, somewhat resembling a mummy, and as hard as a block of wood. This mode of packing was, we presume, to facilitate its transit to a port of shipment, but as it was very expensive to the users, its disadvantages were shown to the Chinese merchants, and now it is not only packed loose, but is sorted and cleaned by a willow. Since this change was introduced, the consignments have largely increased. Messrs. Feather and Sons have been pioneers in all operations relating to the use of camels' hair and other short wools which could not be combed by hand, and were the first to use the Noble comb in their departments, by which hand combed wool was recombed, producing a nice, short, full top, suitable for the hosiery trade. Mr. Feather's business has necessitated extensive travel. He has visited some of the remote portions of Russian Tartary, and made an expedition over the Khirgiz Steppes. During 1888, he paid a visit to America, along with Mr. Joseph Benn, another gentleman engaged in the textile trade, and two other well known Bradford gentlemen. While there, an invitation was sent to him to become the Mayor for the year just closed, but the offer was declined. His selection, at the present time, is looked upon with satisfaction by all, as may be understood when we state that on four separate occasions has he been returned a member of the Council without opposition. Although in politics he is a Liberal, he is not by any means a strong partisan, and this, backed by his undoubted personal merit, may have something to do with the high esteem in which he is held by all classes of the community. We may say that never during his public career has he appeared on any public platform. He has always been alive to the interests of the town, and has served not only as a member of the Council, but as Deputy Chairman, and, later, as Chairman of the Street Improvements Committee, therefore, he is not new to the intricacies of municipal government, and should fill the office of Mayor with credit to himself and satisfaction to the great textile town of Bradford. Besides following his legitimate business, Mr. Feather has a connection with some of the public companies of the town. He is Chairman of the Bradford and Shelf Tramways Company, of the Yorkshire Branch of the Economic Insurance Company, and is a director of the Theatre Royal, Waller and Sons, Limited, Brewers, the Northern Counties Trust, and of the Model Lodging House Company. Mr. Feather purchased, some years ago, a charming country house at Baildon, known as the Rookery, where he now resides.

Mr. Smith Feather.

England is second as an exporter of woollens to Mexico, with a little more study of local wants, says the British Consul, England might probably increase her imports of woollens to the market. America is a serious rival, although not in woollens.

## German Fabrics for Spring Season.

It may be of interest to notice what is being done in Germany in the way of fabrics for the spring season. *Kuhlow's German Trade Review* says:—"At Neumünster, Spremberg, and Gladbach, waterproof stuffs are being made. Mohairs and alpacas are largely produced at Görlitz and Zittau. Elberfeld has very good orders in mixed silk and mantle stuffs. Elberfeld and Crefeld are now turning out novelties in silk and mixed stuffs for ladies' ready-made clothing, and these are largely ordered. In the same places, mixed silk matelassés, brocatelles, Siciliennes, stripes on royal ground, armures, smooth and damask, with velvet flowers and embroidered flowers, are pretty largely taken up; some single novelties in silk damask stuffs—filigreed à jour—with velvet stripes are also ordered. The Berlin manufacturers have brought out their summer novelties; among these the chief are Cheviots, plain and mixed, striped and napped, also ramagé Cheviots. Next spring, black and coloured spaddle embroidery may be largely used for mantles and costumes, and passementerie has also good prospects."

The *Leipzig Woch. Berechf. Text. Industrie* says:—"Fleurette and rococco styles will be greatly in fashion for the spring. 'Fleurette' is explanatory of the whole technique of the style—large flower patterns produced in broché. The jacquard ramagé styles, so popular last summer, are no longer fashionable. The 'Fleurette' comes both woven and embroidered. The flower designs are brought at certain intervals on 'mode' ground stuffs, so as to cover the ground weaving. Lilacs, wild roses, or narcissus (daffodil) are brought out on heliotrope coloured Cheviot and Indian cashmere. Yellow ranunculus, bordered with green leaves, are produced on electric blue crapes. Some of the designs are exceedingly pretty, especially in machine embroidery, and innumerable variations are produced by the different patterns of the ground stuff. The designs may be brought on wide striped ground stuffs, flamme, or on very fine napped. A new coloured combination for striped flammes is light grey and light lemon yellow. Maize yellow, mixed with lilac shades, gives very pretty and fashionable combinations. This 'Fleurette' style depends on effects of light colours, while the rococco consists in having dark ground colours. The whole system of large fleurette and rococco patterns is in unison with the returning fashion in 'pentes'—putting in insertion stuffs and using them as aprons, or side pieces for dresses. These large designs in flower and Arabesque patterns seem to gain favour, but they are also produced to harmonize with chine stuff. It is a peculiarity of French manufacturers that they are always giving a variation to old goods fashions, and now large branches with leaves, and bunches of tulips and lilies are taking the place of small flower patterns, while very large designs of ostrich feathers are also brought out. A very handsome stuff has chine stripes bordered by large water roses. A beautiful sample before us is in maize and heliotrope shades, and no more beautiful combination of colours can be imagined. The parti-colour Turkish style is also coming to the front, but we do not believe that it will meet with more favour than last winter. Another style, too, is coming forward; the ground is always dull, but the designs very brilliant. In these new stuffs, the design is not brought out by black effects as formerly, and dull and parti-coloured effects are now coming into favour. The German manufacturers in Greiz, Gera, Elberfeld, &c., will make a speciality of black cashmere stuffs for the spring. There will be armures, black and coloured, plain and striped. Piqués and combinations will be very fashionable, but heavy stuffs will have to be used. Diagonally striped corkscrews are also shown, very small ribbed. Very pretty effects are produced by longitudinal stripes by putting dull and brilliant colours alongside."

French manufacturers are devoting a good deal of attention just now to a process invented by Mr. Bannister, an Englishman, for an improved method of dyeing tissues or felt. The object the inventor has in view is to supersede the use of the mordants now ordinarily employed, and to substitute the use of one single operation. For this purpose, Mr. Bannister employs a combination of ingredients which are approximately the following:—To 250 litres of water add of copperas 4 kilos., blue-stone 4 kilos., common calcined soda, or an equivalent alkali, 3½ kilos., oxalic acid 4½ kilos. All these ingredients are boiled down until they are completely dissolved, and then 75 kilos. of logwood and 750 grains of fustic are added to them.

## Original Designs.

On our first plate is a design for a Curtain, suitable for either Tapestry, Lace, or Cretonne.

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On our second one is a design, on ruled paper, for a Leno Dress Fabric. The pattern, as it appears in the cloth, is shown in the article on "More Designs for Fabrics," commencing on page 49.

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Our third plate shows a design for a Dress Fabric, particulars of which are given in the article mentioned above.

## Monthly Trade Reports.

WOOL.—There has been an active business done in raw material and, for nearly all descriptions, prices have had an advancing tendency, and especially has this been the case in English wools, whilst Colonial classes have met with a ready sale. Spinners of yarns have found the advancing prices of wools against them, and in taking new orders have fought hard to obtain rates to compare favourably with those of the raw material, but, with only moderate success, still, on the whole, the new business has not been unfavourable. Generally, full time is being run, and orders are in hand to last the remainder of the year. Manufacturers are generally very busy and have been so during the month, makers, especially of bright fancy fabrics, having a good run at present. The home trade is particularly brisk, merchants have bought freely for next season, and the Continental branches have taken a good average. In the American coating business, there has been a quieter state of things, prices, generally, have had a higher tendency, but not adequately to the advance of the raw material.

COTTON.—The transactions in the various departments of the cotton trade have been of a more extensive and satisfactory kind, during the past month, than has been the case for some time past. The difficulties raised by the "corner" have, to a great extent, been removed, and business all round has been put upon a firmer basis, and, as a consequence, the purchases of yarns and cloth have been very large, and orders of a fairly remunerative character have been given out freely for most of the leading markets, both at home and abroad. Spinners, who could afford it, have covered orders in hand with raw material, and, consequently, feel in a much safer position than for months past. In yarns, China, Japan, and the Continent of Europe have bought freely, but India has not operated above the average. Manufacturers have also bought yarns extensively, though, in many cases, they are for forward delivery, extending over the next three or four months. There has been a good all round demand for cloth, and, in the best and common grade of shirtings for China—and in shirtings and dhooties for India—looms have work sufficient until the close of the year, and, in many cases, well into the next. In printers, especially those of a good quality, stocks have been mostly cleared out and orders have come in freely.

WOOLLEN.—In nearly every branch of the woollen industry, there has been a brisk business done during the month, and so fully engaged are manufacturers in some departments, for months to come, that new work is being repeatedly refused. In the best classes of worsted, there has been the usual cheerful demand, new patterns of a rather neater and quieter character are now ready to be shewn to merchants, and these are certain to bring large orders for next season's trade. The demand for serges, meltons, and medium and low tweeds has been heavy recently, and makers have been very indifferent about entering into new contracts. The mantling branches have also been good, and seem likely to remain so for some little time. The clothing departments have shown a falling off owing to the mild character of the weather, the demand for winter clothing being rather quieter, but this fact does not seem to have affected manufacturers much. Prices all round have had a higher tendency.

LINEN.—The linen trade has recently assumed a rather quieter tone, and, in consequence, short time is now being run in many mills, and manufacturers are likely to curtail production of most classes of goods. The demand for damasks generally has been much quieter, with, perhaps, the exception of towellings; these have sold fairly well, both in plain and fancy styles. Bed linens have also been in fair request, and the same may be said of sheetings. Stair carpetings have experienced a falling off in demand, and new orders have been few. Toilet covers, tea, pantry, and domestic cloths generally have had an average sale. Much complaint has been made of the low ebb to which profits have declined, the margin being very slight.

LACE.—It is but seldom that we have to chronicle any cheerful feature in connection with the lace trade, but, during the past month, there has been a decided improvement in two or three branches, this applies most particularly to the pointed fancy millinery laces, in which a considerable business has been done recently, some makers of these being well employed. There has also been more animation in the curtain department, some good American orders having been given lately. Other branches have not shown many signs of revival, business generally being of a hand to mouth character. Prices have not altered to any quotable extent.

## New Patented Fabrics, &c.

### FABRICS FOR SLIPPERS, GARMENTS, &c.

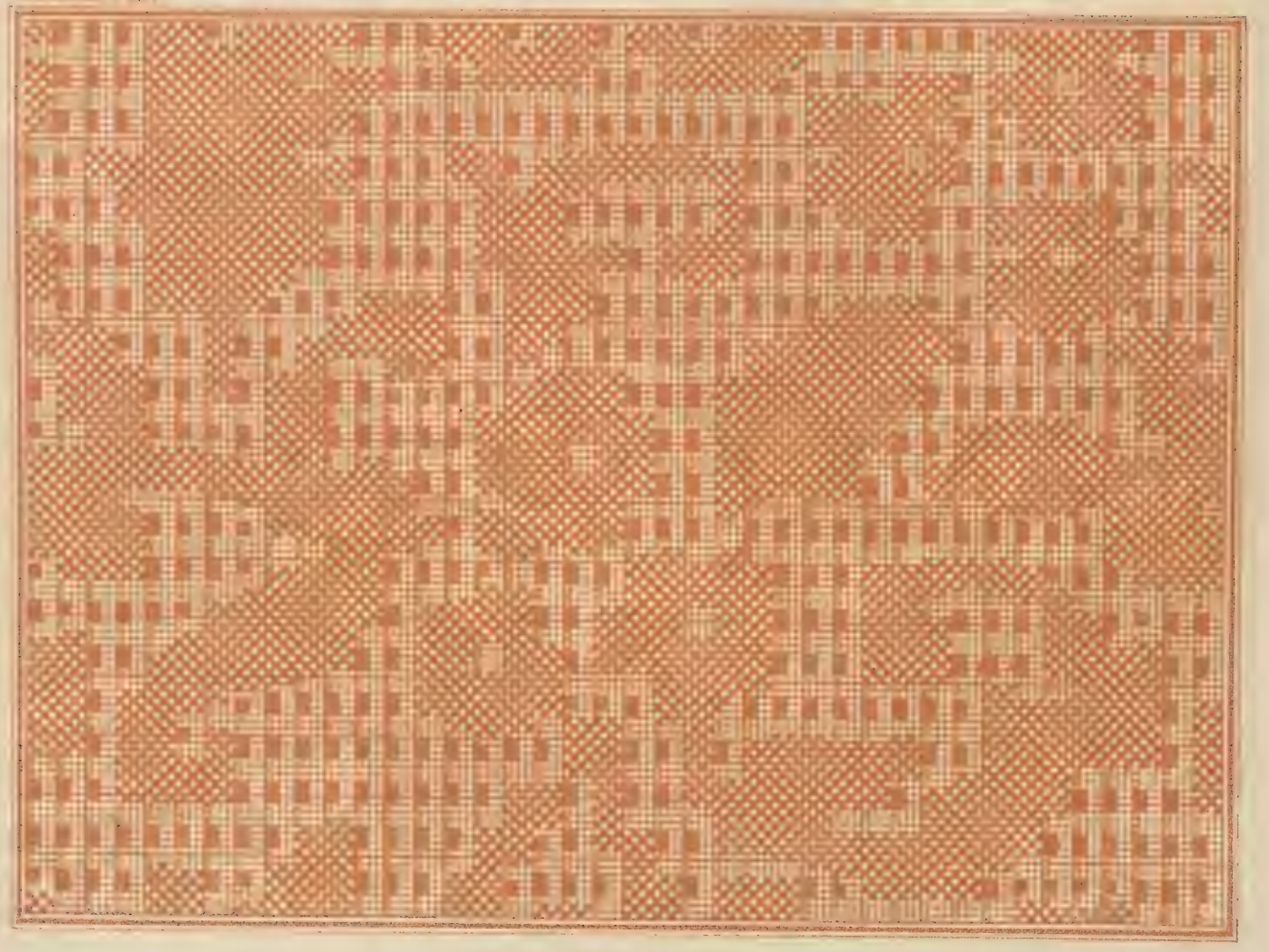
An invention, having for its object the dispensing with marking plates, which are often employed in the wholesale clothing, and other branches of ready made fabric trade, has recently been patented. It is claimed by the method now under notice that a great saving in material and time is effected. Generally, in preparing for cutting out garments and uppers, the practice has been to employ "plates" of the required size, which have been used as marking plates; these have been laid upon the piece from which the garments or uppers were to be cut, and the outline has been traced by means of a pencil or marker, the quantity of waste from material of any given width being dependent on the skill with which the plates have been manipulated, but, in all cases where plates have been used, skilled labour has been requisite, and much waste of material has occurred, especially in figured fabrics.

According to this patent, the inventor prints or weaves the design or pattern for the several parts of the garment, and also for the "front" of the "upper," or for the front and "back" of the upper, as well as the correct outline, or configuration of the front or back of the garments, slippers, shoes or boots, on the fabric; this ensures the pattern or design (if any) being central, or in correct position, on the garment or upper, whatever its size, and also provides an outline for each front, or back, by which the cutter is provided with a guide, and has simply to cut by the outline, no skilled labour being requisite.

### PRODUCING SELVAGE EDGES ON PILE FABRICS.

In some cases, when pile fabrics are woven in broad widths, it is desirable to convert them into narrow goods by dividing them longitudinally into two or more widths, and to form each of such widths with selvage edges with pile. In cases, also, where selvage edges are injured or torn, it is desirable to cut them away and produce new ones. By a recent invention, the selvage is formed from the body of the piece by cutting away the pile from a narrow strip along the edge of a width of the pile fabric, so as to leave the back, or ground, to form the selvage, and the edge of the selvage is then secured by whipping it over with a sewing machine. This is preferably effected in the finishing process. Mechanism is provided upon the shearing machine, by which the portion required for the selvage is cut clear away of pile from the ground or back of the piece, after which the edge of the selvage is sewn by means of a sewing machine which whips and binds the thread around the edge of the selvage; by this method, the edge is made fast, and similar to a woven selvage. When a selvage is to be produced in accordance with this invention, the piece of fabric is passed through a shearing machine, such as is commonly used for shearing the pile, but a bridge piece is first arranged in the proper place upon the rail which supports the fabric under the spiral knife. This bridge piece serves to raise the portion of the fabric which passes over it somewhat higher than the rest of the fabric which passes over the edge of the rail, so that the knife here cuts down to the foundation of the fabric in place simply of shearing the tips of the pile to bring it to an even surface. The bridge piece is equal in width to two selvages; in the case of dividing a wide piece into two narrow pieces, or where a new selvage is to be produced close to the margin of the piece to replace a damaged selvage, a narrower bridge piece can be used. On each side of the bridge, springs are arranged to press upon the face of the fabric, to keep it away from the knife, so that the inner edge of the selvage may be sharply defined. Thus, when the piece leaves the shearing machine, there will be a stripe or stripes without pile extending along it from end to end. When the piece comes from the shearing machine, the fabric is cut along the centre of each of the stripes, except where the stripe is close to the edge of the piece, as it will be when the object is to replace a damaged selvage, and then the fabric is cut so as to leave a selvage of suitable width. The fabric is then taken to a sewing machine of the lock stitch class, working with two threads—a needle thread and a shuttle thread. This machine, in place of the usual feeding appliance, which advances the fabric stitch by stitch in a straight line, has a feeding appliance such as will produce a zigzag line of stitches, sometimes called "herring bone" sewing. Such machines are well known and in use for other purposes. The work is so guided through the machine that, for one stitch, the needle descends through the fabric a short distance within the edge, and, for the next stitch, it descends just outside the edge, missing the fabric. For the third stitch, the needle again passes through the fabric as for the first stitch, and so on, in such a manner that the edge of the fabric becomes whipped or bound round by the sewing threads, so that it cannot fray or unravel. As to the length of the stitches, this may be varied, but ten to the inch will be found suitable, and they may pass through the fabric at about this distance, or rather further from the edge.

CURTAIN.



LENO DRESS FABRIC.

DRESS GOODS.

# SUPPLEMENT

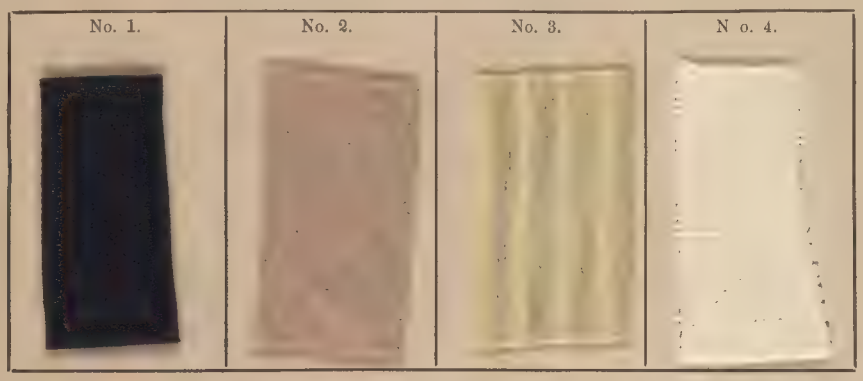
TO

The Journal of Fabrics and Textile Industries,

NOVEMBER 12TH, 1889.

## PAGET'S WARP WEAVER AND KNITTER WITHOUT WEFT.

*The following Cloths have been woven on the above Machine, for particulars of which see Page 52.*






1 Slate, face, 2/40's worsted.
2 Brown, face, „
1 Brown, back, „
3 Brown, face, „
1 Black, back, 11 sks. woollen.
2 Twist, face, 2/40's worsted.
1 Brown, face, „
1 Black, back, 11 sks. woollen.
3 Brown, face, 2/40's worsted.

2 Black, face, 2/40's worsted.
1 Black, back, 11 sks. woollen.
1 Black, face, 2/40's worsted.
2 Blue, face, 2/40's worsted.
1 Blue, back, „
1 Blue, face, „

— } 4 times.

84 ends in pattern.

1 Black worsted, 20's.
1 Face, 27 skeins woollen.
1 Back, 15 „ „

24 ends in pattern.

The *Adelaide Observer* for the 31st August last says that it is estimated by a gentleman of experience, who recently visited the colony of New South Wales, that about 38 million odd sheep, or a million more than last year, will be shorn during the present season, but that there will be a large falling off of lambs shorn. The total clip is expected to be about equal to that of last year.

DRESS GOODS.

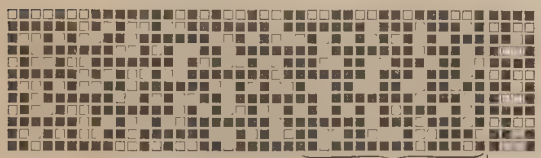
# FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

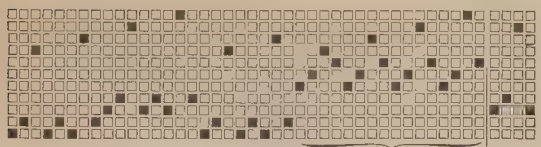
The specimens of fabrics made on Paget's Warp Weaver and Knitter without weft, which we have announced to be given in former numbers, are shown on a Special Supplement. We give four samples of varieties of fabrics. So varied are the uses to which this machine can be put that it would be impossible to give a specimen of every kind which it will produce. The four patterns will show the value of the machine to manufacturers. A description of the patterns appears on page 52.

## Worsted Trousering.

No. 610.



Design. Twice. Repeat first 24 here.



Draft. Twice. Repeat first 24 here.

Pegging Plan.

5,376 ends in pattern; 84 ends per inch; 12's reed, 4 ends in a reed; 64 picks per inch; 64 inches wide in loom; 56 inches wide when finished. 23 oz. cloth.

Weft:—22 skeins woollen.

| Ends. | Warp:— | |
|---|---|---|
| 2 | Black, face, 2/40's worsted. | 4 times |
| 1 | ,, back, 11 sks. woollen. | |
| 1 | ,, face, 2/40's worsted. | |
| 2 | Slate, ,, ,, | |
| 1 | Black, back, 11 sks. woollen. | |
| 3 | Slate, face, 2/40's worsted. | |
| 1 | Slate, back, ,, | |
| 3 | Slate, face, ,, | |
| 1 | Black, back, 11 sks. woollen. | |
| 3 | Slate, face, 2/40's worsted. | |
| 1 | Black, back, 11 sks. woollen. | |
| 1 | Slate, face, 2/40's worsted. | |
| 2 | Brown, face, ,, | |
| 1 | Brown, back, ,, | |
| 3 | Brown, face, ,, | |
| 1 | Black, back, 11 sks. woollen. | |
| 2 | Twist, face, 2/40's worsted. | |
| 1 | Brown, face, ,, | |
| 1 | Black, back, 11 sks. woollen. | |
| 3 | Brown, face, 2/40's worsted. | |

| Ends. | Warp continued:— | |
|---|---|---|
| 1 | Black, back, 11 sks. woollen. | 4 times |
| 1 | Brown, face, 2/40's worsted. | |
| 2 | Slate, ,, ,, | |
| 1 | Slate, back, ,, | |
| 3 | Slate, face, ,, | |
| 1 | Black, back, 11 sks. woollen. | |
| 3 | Slate, face, 2/40's worsted. | |
| 1 | Black, back, 11 sks. woollen. | |
| 1 | Slate, face, 2'40's worsted. | |
| 2 | Black, face, 2/40's worsted. | 4 times. |
| 1 | Black, back, 11 sks. woollen. | |
| 1 | Black, face, 2/40's worsted. | |
| 2 | Blue, face, 2/40's worsted. | |
| 1 | Blue, back, ,, | |
| 1 | Blue, face, ,, | |

84 ends in pattern.

## Woollen Trousering.

No. 611.

Design.

| Ends. | Warp:— | |
|---|---|---|
| 1 | Black. | |
| 1 | Slate. | |
| 1 | Twist. | |
| 1 | Black. | |
| 1 | Twist | 5 times. |
| 1 | Slate | |
| 1 | Light Olive. | |
| 1 | Slate. | |
| 1 | Dark Olive | 3 times. |
| 1 | Slate | |

| Ends. | | |
|---|---|---|
| 1 | Dark Olive. | |
| 1 | Black. | |
| 1 | Dark Olive | Twice. |
| 1 | Slate | |
| 1 | Black. | |
| 1 | Slate. | |
| 1 | Brown. | |
| 13 | Slate. | |

44 ends in pattern.

4,032 ends in warp; 64 ends per inch; 16's reed, 4 ends in a reed; 70 picks per inch; 63 inches wide in loom; 56 inches wide when finished. Weight 23 ozs.

Weft:—3 picks Slate.
1 pick Black.

Warp, 20 skeins woollen.
Weft, 24 ,,

## Woollen Suiting.

No. 612.

Design.

| Ends. | Warp:— | |
|---|---|---|
| 1 | White | Twice. |
| 1 | Black | |
| 1 | Dark Grey | Twice. |
| 1 | Black | |
| 4 | Black. | |
| 1 | Dark Brown. | |
| 1 | Black. | |
| 1 | Twist. | |
| 1 | Black. | |
| 1 | Dark Green | Twice. |
| 1 | Black | |
| 4 | Black. | |

24 ends in pattern.

| Picks. | Weft:— |
|---|---|
| 4 | White. |
| 10 | Black. |
| 2 | Twist. |
| 10 | Black. |

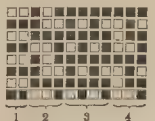
26 picks in pattern.

Warp, 16 skeins woollen.
Weft, 24 ,,

4,136 ends in warp; 64 ends per inch; 16's reed, 4 ends in a reed; 60 picks per inch; 64 inches wide in loom; 56 inches wide when finished. Weight 26 ozs.

## Fancy Trousering.

No. 613.



1 2 3 4 Reels.
Design.

Draft.

Pegging Plan.

| Ends. | Warp:— |
|---|---|
| 2 | Black cotton, 5's. |
| 1 | ,, worsted, 20's. |
| 1 | ,, cotton, 5's. |
| 5 | ,, worsted, 20's. |
| 1 | ,, cotton, 5's. |
| 2 | ,, worsted, 20's. |
| 2 | ,, cotton, 5's. |
| 1 | ,, worsted 20's. |
| 1 | Slate cotton, 5's. |
| 1 | White silk, 30/2's. |
| 4 | Blue worsted, 20's. |
| 1 | Slate cotton, 5's. |
| 1 | White silk, 30/2's. |
| 1 | Black worsted, 20's. |

24 ends in pattern.

4,680 ends in warp.
72 ,, per inch.
24's reed.
64 inches wide in loom.
56 ,, when finished.

Weight 21 oz.

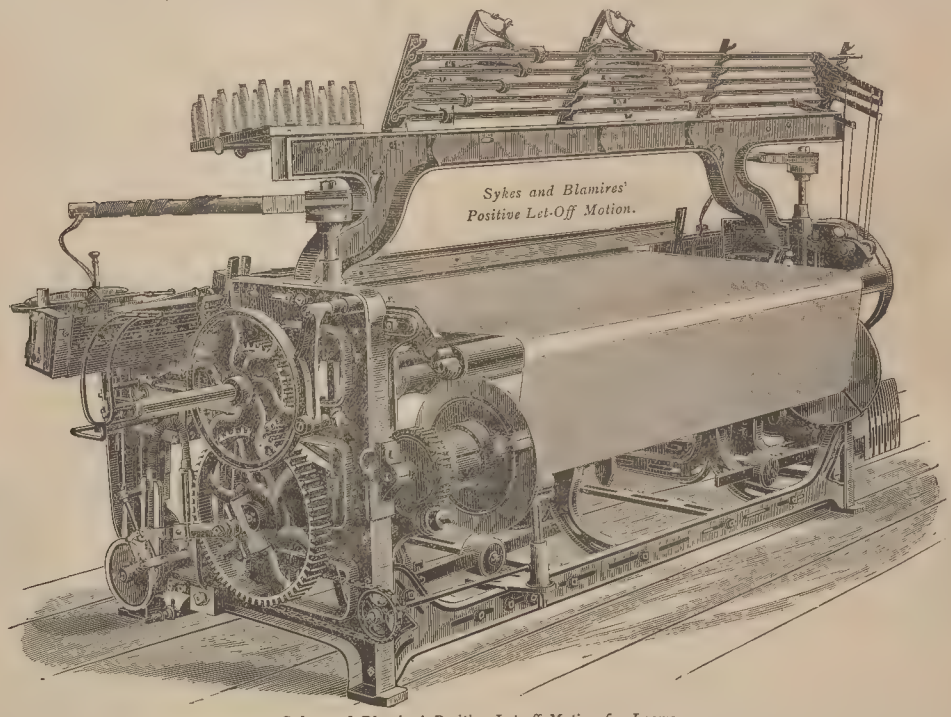
| Picks. | Weft. |
|---|---|
| 1 | Face, 27 skeins woollen. |
| 1 | Back, 15 ,, ,, |

The *Adelaide Observer* for the 31st August last says that it is estimated by a gentleman of experience, who recently visited the colony of New South Wales, that about 38 million odd sheep, or a million more than last year, will be shorn during the present season, but that there will be a large falling off of lambs shorn. The total clip is expected to be about equal to that of last year.

# MACHINERY, &c.

## Sykes and Blamires' Letting-off Motion for Looms.

For the more effective letting-off of the warp threads, during the weaving operation, there have been patents granted almost without number, and still those in operation in various parts of the textile districts are being continually improved upon. One of the chief drawbacks to this description of mechanism is that it is often only effective on the class of loom for which it has been specially invented, and when applied to one of a rather different type, or, to one weaving a totally different fabric, the apparatus is more or less a failure, and becomes a source of constant worry to those having the oversight of it. An improved letting-off motion has been recently patented by Messrs. Sykes and Blamires of Cleckheaton, for which it is claimed that it will act equally effectively in the weaving of any description of fabric, from the finest silk to the coarsest jute. Of course, all practical weavers know that, to have good weaving, it is necessary that there should be a uniform quantity of warp delivered, or let-off, from the warp beam, from the commencement to the finish of weaving a piece of fabric, and as, in weaving, the diameter or the circumference of the warp on the warpbeam is, or ought to be, a constantly and uniformly diminishing number from beginning to end, so also, and in exactly the same proportion, must the speed of the revolutions of the warpbeam be a constantly and uniformly increasing number to secure an unvarying amount of let-off. Bearing this in mind, the patentees have constructed an ingenious mechanism upon a geometric principle, being an application of what is termed a link motion. In carrying out the idea, ropes, levers, and weights have been dispensed with—there are no change wheels required, nor any calculations to make, and, when the letting-off motion is once set, which is easily and speedily accomplished, it requires no further attention from the commencement of the weaving to the finish. When once the warp is woven and another replaces it, whether it be finer or coarser, stronger or weaker, whether it be cart ropes or cobwebs, that may have to be woven, whether there are 25 picks to the inch, or 500, it makes no difference whatever, all that is necessary is to set a crank pin in a slot of a fender bracket to its proper place, which is indexed to assist in doing so. The warp is not dragged off from the warp beam, but is automatically and positively let-off with a precision that is mathematical. The motion can be fixed to any loom, in about two hours, even when a warp is upon the beam and partly woven. The fixing is easily accomplished, as there is no boring of the loom castings required, the apparatus being prepared ready for adding to the loom before it leaves the mechanics' shop. The main features of the motion can be seen by a glance at the accompanying illustration. By means of the tappet wheel at the end of the shaft of the loom, a connecting rod moves or oscillates a link, which brings into action the dogs on a disc and the horizontal driving shaft which actuates the bevel wheels, as well as an oblique worm shaft with its worm, this working the worm wheel on the end of the warpbeam. There is one continuous action constantly going on when weaving. The letting off, so far, is simply positive. And now we must explain the collateral parts and collateral functions, which are automatic, and constantly in operation during weaving. Underneath the warp beam, and touching the warp, and following it by gradually rising with the gradual diminishing diameter of the warp, is a roller which is actuated by a crosshead on a triple screwed vertical spindle. The crosshead, like a falling or sliding body down an inclined plane, has a tendency to fall or slide down the triple screwed spindle by its own inherent weight, assisted by the oscillations of the link, and it actually does slide down freely, if permitted to do so, in consequence of the high angular inclination of the plane of the screw. Then as the roller rises, by means of suitable mechanism, the crosshead lowers, giving an increased oscillation to the link, which compensates for the diminishing circumference of the warp on the beam, and thus automatically gives off exactly the same amount of warp at the finish as at the beginning. The second automatic and collateral function which the machine performs is for the purpose of preventing any slackness which may arise during the course of weaving. This automatic action is not continuous, but conditional. It remains generally quiescent, but always on the alert, ready to start into action the moment the slightest slackness occurs. The prevention is effected by the following collateral parts:—On the back rail, which is suspended and free to oscillate or vibrate somewhat, by means of spiral springs, which are fixed between the back rail and lugs projecting from brackets, is suspended a long arm, to the bottom of which is connected suitable mechanism. As soon as any slackness arises, even to the hundredth part of an inch, spiral springs press outwards the back rail slightly, but at the bottom of the long arm it is considerable, so that it dislocates the sliding portion of a clutch from its counterpart on the boss of the bevel wheel; when the letting-off is automatically stopped in this way, it remains so until the slackness is taken up. Sometimes the clutch will be in and out several times in an hour, where a long slack place comes on, and sometimes it will be days together and never come out in a well-dressed or beamed warp. Thus there are, as it were, three distinct motions:—The first is the direct positive letting-off; second, the automatic,

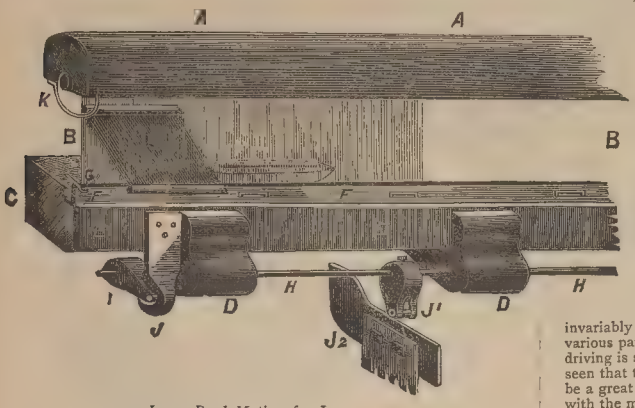



*Sykes and Blamires' Positive Let-off Motion for Looms.*

constant, and collateral function of letting-off a definite and fixed quantity from the beginning to the end; third, the automatic conditional and collateral function of preventing any slackness which may, and frequently does, arise in weaving. The apparatus is being made by Messrs. George Blamires and Co., Engineers, Tofts Works, Cleckheaton, where it can be seen at work, and where cost, &c., can be had.

## Austin, Webster and Wilby's Loose-Reed Motion for Looms.

A decided advance on the loose-reed class of mechanism has recently been patented by Messrs. Austin, Webster and Wilby, of Morley, near Leeds, which, in contra-distinction to the loose reeds now in common use, and which are fastened by their upper ends, is an *entirely* loose one, falling out of the top shell and beam of the loom, when a shuttle is "trapped," in such a manner that, when this happens, the reed is not connected to the shell or beam in any way, but hangs loosely by its ends to wires shown in the illustration below. In addition to having this great advantage over loose-reeds in general use, it has points of merit in its mechanism that will highly recommend it to users of looms, especially to those engaged in the manufacture of cloths in which the wefts are of a tender nature, although it will be found very beneficial in the weaving of other classes of fabrics. The motion combines simplicity and lightness with strength and durability, and can be applied to either "fast" or "slow" speed looms. When the beating up of the weft is taking place, the reed keeps perfectly firm. Neither spring, frogs nor chisels are required in the mechanism, and, in consequence, there is no "banging off," and the breakage of cranks, wheels, &c., from this cause is reduced. The apparatus has been thoroughly tested during the past twelve months, and the patentees can, with confidence, recommend it to users of every variety of loom. It is easily and quickly fixed. The accompanying illustration shows the mechanism connected with the loose-reed.

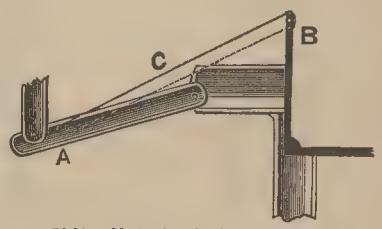



*Loose Reed Motion for Looms.*

A A is a section of the top shell of a loom; B B the slay; C the slay beam; D D are two or more castings fixed to the under part of the slay beam; the castings have slots in which a weft bar E E rises and falls. Behind the bottom part of the slay B B is placed a loose leaf of iron F F, this loose leaf being for the purpose of holding the slay in position. The leaf is fastened to the slay beam in a suitable manner, being held upright by springs G. Through the castings D D a rod H is carried the whole length of the loom, and to this rod are keyed two or more castings I, these working in castings J. A casting, J1 is also keyed on the rod H H. The working of the mechanism is as follows:—The reed is put into the top shell and slay beam in the usual manner when the loom is in operation; as the slay moves towards the front top rail and back again, the casting J1 also has a corresponding motion sliding up the castings J2, and back again; this causes the weft bar E E to rise just before the slay *strikes the cloth*, and then to fall again as the slay recedes. Should the shuttle be *trapped* in the shed when the loom is working, the weft bar being below the bottom of the loose leaf F F, the shuttle striking against the slay causes the slay to push the loose leaf backwards, and thus the slay falls out *entirely* from the top shell and slay beam. When this happens, the ends of the slay drop on the wires K, thus preventing the slay from dropping its weight upon the warp. The position of the slay after falling out can be seen at L. The slay can afterwards be slipped easily and quickly into position again. For the past 12 months, the mechanism has been working upon looms, and in such an efficient manner that a great saving has been effected in having fewer breakages in weft, whilst, at the same time, larger quantities of work have been produced than on looms running without this motion. Comparisons have been made upon looms running side by side with a result highly favourable to this mechanism. We have had many opportunities of seeing the working of the motion, and it appears to us to be all the inventors claim for it, its advantages being such that any manufacturer can quickly judge its merits by having a single loom fitted with the apparatus. All particulars and prices can be had of Mr. Wilby, 4, Marshall Street, Morley, Leeds.

## Musgrave and Dawson's Picking Mechanism for Looms.

The number of inventions patented during the past five or six years for improvements of the various parts of the mechanism of looms has been surprising. Some of these have been of great utility, whilst others have, in no way, been an advance on previous existing mechanisms. Amongst the improvements, there have been many for the purpose of easing the picking motion of looms, but we venture to say that there has been none which, for efficiency combined with the small cost of fixing, can vie with the one we are about to describe. The prime feature of all picking improvements is to take away, or to reduce to a minimum, the pressure from the "swell" and, consequently, the strain invariably incident to picking. In order to accomplish this effectively, the looms of various makers have some device which acts more or less successfully, but with, in too many cases, a complication of mechanism which is continually giving way under the constant vibration of the loom, and, in addition, picking straps, sticks, studs, and shafts, are more or less damaged, and repairs are frequently needed. In the invention under notice, which has been thoroughly tested, the repairs needed in connection with the picking motion have been simply nil for some time past. The accompanying sketch will give a good idea of the simplicity of the arrangement. A is the crank arm of a loom, B is the stop rod finger, C is a leather strap which is fastened by one end to the finger B, and by the other end to a given point on the crank arm A. When the loom is in operation, at the time the going part is commencing its backward motion, and when the shuttle is just about to leave the shuttle box, the depression in the movement of the crank arm A causes a tightening of the strap C, and the consequence is that the stop rod finger is pulled back, and the easing of the "swell" is accomplished. The action of the loom is in every respect as usual, the stop rod and frog acting exactly as if the strap, &c., were not on the loom. A great advantage resulting from its use is that "weft cutting" is, to a considerable extent, prevented, as the shuttle is stopped as usual by the action of the spring on the "swell," &c. In driving the loom, the appliance has a great tendency to reduce the vibration




*Picking Mechanism for Looms.*

invariably accompanying the running, as well as the general strain on the various parts of the loom; the consequence is that the power required for driving is sensibly reduced, and a great saving is effected. It will be readily seen that the cost of strap and fixing is very slight, and it will undoubtedly be a great advantage to all users of looms to enter into correspondence with the makers, who will give every facility to those interested to see the motion in operation, and will arrange with them so that they can fix it upon the looms themselves. Applications can be made to Messrs. J. K. Musgrave and Co., Penny Oaks Mills, Leeds Road, Bradford.

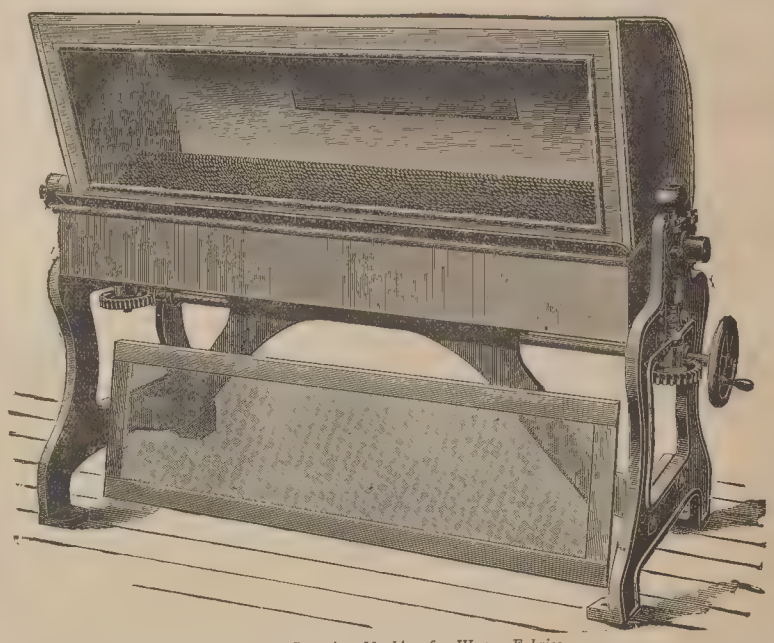
## A New Roller on the Carding Machine.

To clean the cylinders on wool cards having the ordinary card clothing, says a French inventor, another roller has been introduced, the teeth of the clothing of this roller being turned in a reverse direction, and this roller revolving faster than the cylinder to be cleaned. For this purpose, the so-called doffer was also used, together with a moving doffer comb, the teeth of which seized into the doffer clothing, and dug out the wool. It is well known that the speed of the doffer must not exceed a certain limit, because the moveable comb must not continue its strokes too quickly for fear of heating. This process is, therefore, tedious and tiresome. The inventor uses a doffer cylinder, with brush-like clothing, together with two stripping combs, one of which is stationary, and the other moveable. The doffer cylinder revolves in an opposite direction from, and one half faster than, the cylinder to be cleaned. The doffer teeth may be straight or inclined, and consist of very fine, elastic wires, which stand as close as possible, so that the wool doffed from the cylinder remains at its extreme outer ends. Against the outer circumference of the cylinder is a comb curved according to the arc of the latter. It its stationary, and its teeth points enter about eight or ten millimetres (0·31 to 0·39 inch) into the teeth of the doffer clothing. The teeth of the stationary comb stand very closely together, from one-fourth to one-half millimetre (0·01 to 0·02 inch) apart. The wool carried by the doffer to the stationary comb is thus stripped uniformly from the former, and slides on to the back of the arched comb, the front end of which is sharp. A moveable comb or doffer knife, which neither seizes into the teeth of the doffer clothing, nor into those of the comb, strips the

wool from the back of the latter and lets it drop. As the moveable comb does not now require to seize deep into the clothing to be cleaned, its vibrations can be more rapid without fear of heating, and thus the speed of all the parts may be much greater. Besides this, the doffer comb no longer tears the wool forcibly out of the cylinder, but, being gently and gradually pressed out by the stationary comb, its staple is preserved intact, much more so than with the usual arrangement.

## Breadner's Damping Machine for Woven Fabrics.

The damping of fabrics generally in a uniform manner has been the subject of many experiments by those interested in this class of mechanism, and, to carry it out satisfactorily, various modes have been adopted. A machine for this purpose is now being made by Mr. E. Breadner, of 134, Deansgate, Manchester, and as there are several points of merit in his apparatus which are, at least, equal and, in many respects, superior to those generally in use at the present time, we give our readers an illustration of it, from which the leading characteristics of the mechanism may be seen. It will be granted by those who understand the requirements of this class of apparatus that the leading features essential are a uniform distribution of water to damp the fabric, and that the flow should be even, and also that the quantity should be regulated so that the fabric should not be damped too much nor too little. To carry out these requirements, Mr. Breadner has brought much practical knowledge to bear upon the question, with the result that he has produced a machine that in actual work is all that is required. The annexed illustration is a view of the apparatus, in the making of which a cylinder of tinned copper about 9 ins. in diameter is used, the periphery of which is covered with fine wire teeth, these being made about 2 in. long, and are placed on the roller at a distance of about ¼ in. from each other. The cylinder, or to use, perhaps, a more appropriate term—the brush, rotates in suitable bearings, and is so arranged that it dips into a water tank a required depth according to the work it has to accomplish. From this tank it takes up water, and, from its rotating motion, discharges it again through a fine wire grid, the effect of the water passing through the grid being that it forms into a fine spray, and this, playing upon the fabric, damps it in a uniform and effectual manner. In order that the supply of water may be constant, an ordinary ball tap is used, which controls the inlet and assists in keeping the water continually at an equal level, and, in order to prevent any overflow from the tank, an outlet is arranged in such a manner that this cannot occur. For regulating the quantity of water that may be required to be taken up by the brush, the bearings which support the latter are made adjustable, this being effected by having them mounted upon vertical screws geared by bevel wheels to a horizontal shaft which runs under the machine. Upon this shaft is a hand wheel which works either to the right or to the left, and by rotating this, the brush is raised or lowered immediately, and the spray of water is either increased or diminished according to requirements. It will be seen that, to prevent the water being distributed in any direction but upon the fabric, the tank is furnished with a removable cover, and this, in addition, acts as a stay for the upper part of the fine wire grid. The machine is thoroughly practical, and one which, in actual operation, will do its work effectually. The various parts of the mechanism are so arranged that they are easily got at in case of repairs being needed, and the working parts are so simple and few that the danger of them getting out of order is reduced to a minimum. Mr. Breadner will be pleased to enter into correspondence with, and to give full particulars, &c., on application, to any users of such machines.



*Breadner's Damping Machine for Woven Fabrics.*

## Post Office Notice.

### ON SAMPLES ADDRESSED TO ITALY.

Under an agreement between the British and Indian Post Offices, it has been arranged to increase the limits of size and weight allowed for packets of trade patterns or samples addressed to Italy up to the limits which have been adopted for patterns addressed to the Argentine Republic, Belgium, France, Greece, Japan, Luxemburg, Portugal, Switzerland (*via* France), and the United States of America. Henceforth, therefore, the maximum weight of each packet is raised from 8 ozs. to 12 ozs., and the maximum dimensions from 8 ins. to 12 ins. in length, 4 ins. to 8 ins. in width, 2 in. to 4 ins. in depth. In all other respects, the conditions regulating the transmission of trade patterns or samples to Italy through the Post remains unaltered.

## Industrial Products of Greece.

The *Board of Trade Journal* gives the following, amongst other, particulars of the industrial products of Greece. The art of dyeing, so prominent in ancient Greece, has been preserved up to the present time. It is practised at Piræus, Larissa, Ambelakia, Syra, Corinth, Corfu, and Zante. The cotton industry is also one of the most ancient in the country. Almost all the native cotton is used in the spinning mills. The latter chiefly supply the strong kinds, Nos. 1 to 12, which have replaced English threads. The manufacturers devote their energies to producing cheap tissues, which are superior, however, to the articles imported, and which are consumed in the country, and Anatolia, Piræus, which have been called the "Manchester of Greece," is the seat *par excellence* of the cotton industry, in which also participate Larissa, Turnavo, Ambelakia, Parnassida, Syra, Corinth, Nauplia, Patras, Corfu, and Zante. The silk industry has taken a new development. It attracts buyers who admire the solidity, the finish, and the fine indelible colours of its products. Spinning is carried on at Piræus according to the most recent processes, as well as at Calamata, Sparta, Nidi, and Andros. Weaving is carried on at Piræus, Calamata, Larissa, Syra, Hydra, and Zante. The chief manufactures are transparent tissues, neckerchiefs, handkerchiefs, waistbands, scarfs, and tissues of mixed silk and cotton. Greece is an excellent outlet, not only because she is obliged to obtain from abroad the greater part of her articles of consumption and the raw materials necessary for her industry, but also because of the public works in course of execution or projected. Already the Germans have appreciated the importance of the Greek kingdom from a commercial point of view; they have recognised that the greatest obstacle which presents itself to the extension of Greek commerce is the want of capital. In order to remedy this state of affairs, they have created a credit establishment which advances money on mortgage. They have, also, recognised, as well as the English and French, the importance of establishing in Greece branches of their banks. The articles of import into Greece, for which competition is most keen are:—From England—steel, boilers, woollen blankets, sewing thread, iron in pigs, gloves, linseed oil, machinery fixed, machine tools, writing paper, cotton tissues, and tissues of wool. From Germany—woollen blankets, faïence, wrought, hammered and rolled iron, flannel, agricultural machinery, haberdashery, hardware, and printing-paper. From France—light stuffs for women's dress, gloves, window glass, table glass, &c., tools and porcelains. From Austro-Hungary—cordage cloths, glasses, &c., packing-paper, porcelain, and ready-made clothing. From Italy—cloth, gloves, writing-paper, and small wares. From Russia—cordage, &c. The production of valonia is very important, it is sought after by England and Italy, where it is used in dyeing and tanning. The pinna-marina, a large shell fish, supplies a reddish and fine silk. It is caught in the Ionian Sea.

## Personal and Trade Notes.

It is intended to hold an international exhibition in New York in 1892.

Mr. H. Langdale, hosiery manufacturer, Leicester, is having a new factory and warehouse built.

We understand that Messrs. Barlow and Jones, Limited, Bolton, will commence running their new mill soon after Christmas.

Messrs. R. Smith and Sons, carpet manufacturers, are removing from Stourport to Kidderminster, at which place they have built a new shed.

Mr. Alfred Brooks, of the Lee Spinning Company, has just returned from a tour of the United States, where his firm are pushing their business.

It has been decided to hold an exhibition of Belgian products and manufactures in London next year, to be opened on May 1st. The project is well supported by Belgian merchants.

It is intended to hold an Exhibition in Edinburgh next year, which has every promise of being a success, notwithstanding the fact that one has been held there comparatively recently.

There is a project on foot for reviving the flax growing industry in Ireland. Mr. Thomas Dickson, M.P., is taking an interest in the new company, which it is intended to promote.

Messrs. Priestley, manufacturers, of Littletown, Batley, have taken the mill occupied by Messrs. R. Ward and Sons, which, except for a short period, has been standing for some years.

Messrs. Carter and Co., worsted manufacturers, are pushing on with their new factory at Dunkirk, Halifax. Royal Mills, which were burned down during Messrs. Carter and Co.'s tenancy are also being rebuilt.

Messrs. Edmund Potter and Co., calico printers, says an American paper, are meeting with great success in the introduction of their goods to that country.

Mr. T. B. Worth was presented with a handsome silver salver by the workpeople of Severn Valley Carpet Mills, Stourport, on the occasion of his marriage, which took place recently.

The business of the "Wuff" Patent Steam Trap Co, whose advertisement appears in this Journal, has been removed to No. 60, Victoria Road, Leeds.

The Centralverein of woollen manufacturers of Germany propose that an exhibition, devoted entirely to the woollen industry, be held in Berlin in 1890 or 1891.

Queensland, Australia, is going into cotton raising. A cotton manufacturing company, reports state, is to be formed at Ipswich, with £50,000 capital, in £1 shares.

Messrs. Lister and Co., Limited, Bradford, have opened a warehouse at 55 and 57, White Street, New York. They intend doing an extensive business there in silk plushes and seals.

Mr. Thomas Lewis, silk manufacturer, at Abbey Longford, New Mills, Gloucestershire, who died recently, has left over a quarter million of money in personal and real property. By his will, the new schools at Malpas are to be completed and presented to the town.

We hear that Mr. James Dobson, of J. and J. Dobson, the well known United States carpet manufacturers, has been asked by an English syndicate to name a price for his plant. This is not the first but the fifth time such advances have been made and rejected.

From the same authority, we learn that two other concerns have been approached in the same way, and that certain British capitalists are willing to negotiate for carpet plants in the United States, providing that not less than $12,000,000 worth of such property could be purchased at the same time.

Mr. William Strang, muslin manufacturer, King's Park Factory, Greenhead Street, Glasgow, has cause to be satisfied with the achievements of his daughter, Miss Maggie Strang, who has won a national gold medal and the Princess of Wales's scholarship of £25 for a design for surface decoration.

Mr. Charles Harvey, retired linen manufacturer, of Park House, Barnsley, has presented buildings for a Free Library and School of Art to the Corporation of that town. The buildings cost, eleven years ago, £24,000.

The lamentable accident which occurred recently at Templeton's Carpet Factory, in Glasgow, has not been equalled by any disaster in the textile trade since that at Bradford, by which so many lives were lost by the falling of a mill chimney.

Mr. Samuel Cunliffe Lister, the silk manufacturer of Manningham Mills, Bradford, and of Swinton Park, Masham, has bought the Middleham estate, including the historic castle, once the stronghold of the Nevilles. The price paid is between £60,000 and £70,000. The Middleham estate is quite close to Swinton Park.

In the colony of New Zealand, an Act which comes into force 1st January, 1890, has just been passed. It deals with the protection of industrial property and inventions and the fraudulent marking of merchantdise, and is, with but unimportant alterations, a copy of the two English Acts, "Patents, Designs, and Trade Marks, of 1883," and the "Merchantdise Marks Act" of 1887.

Messrs. James King and Sons, Rochdale, are having their new mill fitted with 10,000 to 12,000 ring spindles, made by S. Brooks, Manchester. Joshua Hoyle and Sons, Limited, Summerseat, have given an order for 12,000 ring spindles to the same maker, who has plant for making 10,000 spindles per week. Ninety per cent of ring frames made by S. Brooks are fitted with the Union Gravity spindle, which has been a great success. The works at West Gorton and Newton Heath are working overtime on revolving flat cards and preparation machinery.

Mr. J. Booth, manufacturer, of Lee Bridge, Halifax, has been elected for the third time as Mayor of that town. As a maker of stockinettes, Mr. Booth has been very successful.

Krumlin Mill, Barkisland, near, Halifax is to be turned into a limited company. The owners, Messrs. Hoyle, who have a business at Hebden Bridge, offer to take two-thirds of the purchase money of goodwiil and machinery in fully paid up shares.

Messrs. Fielding Brothers, manufacturers, Todmorden, have just registered their business as a limited company, with a capital of £130,000 in £1,000 shares. We have to announce that the head of this firm, Mr. Samuel Fielding, died on Saturday last.

## The Production of Henequen in Mexico.

The *Board of Trade Journal* has received a despatch, dated the 27th August last, from Sir F. C. E. Denys, Her Majesty's Chargé d'Affaires in Mexico, giving the following information on the subject of the production of henequen in Mexico, but more particularly in Yucatan: — The great activity in the henequen industry of Yucatan is steadily maintained, the value of the fibre exported during the first seven months of the year amounting to over 7,000,000 dols. (£1,005,100). The ports to which it has been chiefly sent are New York, New Orleans, Boston, Havana, Hamburg. The small outlay required to make a plantation of henequen, the little care necessary when once the plant has begun to yield, and the immense profits to be derived from the sale of the fibre at the current price, namely, 26 reals the arroba (9s. 8d. for 25 lbs.), have naturally attracted much attention, and efforts are being made to introduce the plant into other ports of the Republic where the soil offers the necessary features for its successful cultivation. The *Diario Comercial*, in a recent number, states that samples of fibre taken from plants grown at Solidad, in the State of Vera Cruz, have been pronounced in New York to be of a superior quality, and to have realised higher prices than the fibre from Yucatan. In the neighbourhood of Alvarado, in the same State, the *Diario Comercial* mentions that some 140,000 plants have already been planted, and it is considered probable that the cultivation of henequen, if it prove successful, will here supersede that of cotton, which the dampness of the climate and the ravages of the numerous insects have been rendering less profitable year by year. The planters of Yucatan, who are now making large fortunes, may, therefore, have to contend with a brisk competition in the near future.

Those interested in Indian art fabrics will hear with regret that the imports of aniline and alizarine dyes to India are increasing with amazing rapidity. In the year 1886-87 they amounted to 13¼ million ounces, valued at ten lakhs of rupees; in 1888-89 they were 40½ million ounces, valued at twenty-three lakhs. During the first three months of the current fiscal year, the imports were eleven million ounces, or three times more than those of the corresponding period of 1887. It would seem, therefore, that aniline and alizarine dyes are usurping the place of the beautiful Indian vegetable dyes.

Mustard-seed oil has long been used as a condiment in Germany and elsewhere. A new use has now been found for it. As it only begins to solidify at a temperature of 9° to 10° C, and, moreover, forms no fatty acid which could affect metals, it has recently been employed as a lubricant for machinery. According to experiments, its lubricating power is as 263 to 168 as compared with olive oil, while it is more than double that of naphtha. In order to prevent the workmen from using the mustard-seed oil for any but lubricating purposes, it is denaturalised through the agency of a small quantity of petroleum.

An exhibition in honour of the founder of the Erzgebirge lace industry, Georg Einenkel, who immigrated from Antwerp, has been arranged by the town of Buchholz The exhibition contains a rich collection of articles, both those which have been made formerly and those which are being made at the present time. One sees there all sorts of trimmings, from the plainest border to the finest gold galloon, from the cheapest tassel to the dearest passementerie worked with gold and silver thread, and from the plainest wood button to the silk hooked-button. Bone-lace, which was first made in the Annaberg district, is also represented, but here, unfortunately, it is a decaying industry. Articles formerly made here, but subsequently appropriated by the Rhenish or Basle trimming makers, are also exhibited, the ligatures are an instance of this.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the four weeks ending Saturday, October 26th, was 321. The number in the corresponding four weeks of last year was 364, showing a decrease of 43, being a net decrease in 1889, to date, of 223. In addition to these gazetted failures, there were 289 Deeds of Arrangement filed at the Bills of Sale Office during the same four weeks. The number filed in the corresponding four weeks of last year was 300, showing a decrease of 11, being a net increase in 1889, to date, of 61. The number of Bills of Sale published in England and Wales for the four weeks ending Saturday, October 26th, was 749. The number in the corresponding four weeks of last year was 880, showing a decrease of 131, being a net decrease in 1889, to date, of 1,803. The number published in Ireland for the same four weeks was 39. The number in the corresponding four weeks of last year was 34, showing an increase of 5, being a net decrease in 1889, to date, of 77.

# PATENTS.

## Applications for Letters Patent.

Boiler firing apparatus. T. Wrigley, Manchester. 24th Sept. 15,033
Bobbins. J. B. Eves, Belfast. 24th Sept. 15,047
Beetling machine. R. T. Webb, London. 24th Sept. 15,052
Bobbin machine. C. G. F. Commick, London. 1st Oct. 15,439
Breaking flax, &c. J. Anderson, London. 16th Oct. 16,311
Bobbins or spools. A. L. Bostock, Manchester. 22nd Oct. 16,642
Bleaching. J. H. Gartside, Manchester. 26th Oct. 16,925
Carpets. H. Templeton and J. Crabtree, Halifax. 30th Sept. 15,326
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Carding machines. J. Walmsley, Huddersfield. 1st Oct. 15,440
Card clothing fixing. F. W. Thomson and J. Seel, Manchester. 9th Oct. 15,850
Compound for finishing fabrics. I. Levenstein, Manchester. 10th Oct. 15,916
Carrying weft threads. H. Hodgson and C. Bedford, Bradford. 11th Oct 16,007
Comb for cleaning cards. S. Brierley, Rochdale. 11th Oct. 16,013
Carding engines. B. A. Dobson and W. I. Bromiley, Manchester. 15th Oct. 16,193
Cotton yarn and machinery. J. Schofield, Manchester. 16th Oct. 16,258
Cutting piled fabrics. J. J. Mann, Manchester. 19th Oct. 16,509
Combs for lace machines. J. Jardine, Nottingham. 19th Oct. 16,513
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Device for recording weft threads. C. Hamig, London 17th Oct. 16,412
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|---|---|---|---|---|---|---|---|
| 8,782 | 11,819 | 12,259 | 12,261 | 12,506 | 12,617 | 12,814 | 13,045 |
| 13,514 | 16,420 | 17,283 | 4,030 | 4,218 | 9,073 | 9,863 | 9,928 |
| 9,963 | 10,054 | 8,773 | 12,100 | 12,255 | 12,922 | 13,031 | 13,637 |
| 13,767 | 13,867 | 13,940 | 14,232 | 15,070 | 9,071 | 10,177 | 12,695 |
| 13,993 | 14,019 | 14,071 | 14,100 | 14,247 | 17,350 | 10,500 | 10,564 |
| 10,691 | 8,541 | 11,481 | 11,704 | 11,826 | 13,973 | 14,353 | 14,376 |
| 14,410 | 14,442 | 14,478 | 14,479 | 14,700 | 14,705 | 14,884 | 15,991 |
| 16,875 | 2,311 | 5,540 | 9,101 | 9,609 | 10,858 | 10,961 | 11,133 |
| 14,147 | 14,370 | 14,708 | 14,835 | 15,963 | 5,923 | 6,793 | 10,721 |
| 11,048 | 12,203 | | | | | | |

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## Contents.



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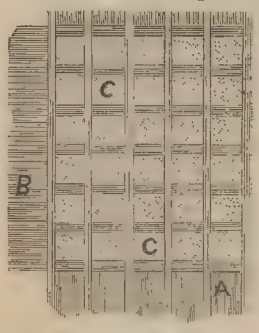
## Specially Interesting to Manufacturers.

THE Journal this month again contains a column of Personal and Trade Notes, to which we beg to draw the attention of our Subscribers. We particularly invite manufacturers, machine makers, managers, designers, and others engaged in the textile trades, to forward us short items of news, either of a personal or trade character, which we shall be pleased to insert, of course, reserving the right to exclude anything which we may consider unsuitable for a column of this description. American Journals are generally more attractive than English ones, because those for whose benefit they are published appear to co-operate with the Editors in making them interesting. In the nine years during which our Journal has existed, we have endeavoured to provide an attractive and useful publication, and in this respect we have been successful, but we consider that, with a little assistance from our readers, some of that brightness, which distinguishes American journalism, might be infused into our pages, to the benefit of all concerned. Therefore, we once more hope to receive the co-operation of all engaged in the textile trades.

## New Patented Fabrics, &c.

### IMPROVEMENTS IN THE MANUFACTURE OF FUSTIANS, SUCH AS CORDS, GENOAS, THICKSETTS, AND CONSTITUTION CLOTHS.

The object of this invention is to produce a new and improved effect on the face of fustian cloths, the improvement consisting in forming elevated checks, squares, or other like shapes, on the face of the fabric. In carrying out the invention, a suitable form of loom is employed, and two or more picks are made together or in succession; this is done with the healds treading what are commonly called double sheds, that is to say, with one half of the warp up and the other half of the warp down, after the manner of weaving ordinary plain and twill back cloths. The




effect of this method of weaving is to ensure that the shoots of weft so picked are depressed, or held down by the warp, whilst the face picks are more prominent or elevated, consequently, when the cutting knife is inserted to cut the cord, these depressed picks remain uncut, while the face picks are cut, thus forming the pile fully. By reference to the accompanying diagram, the nature of the invention will be clearly seen. A represents the warp and B the weft threads. In making this fabric, two or more shoots of weft, B, are sent across the loom and held down by the warp, and, afterwards, a larger number of picks, C, are made and held down at intervals by the warp A, forming squares or other rectangular figures. The weft marked C lies on the face of the fabric, and when the cutting knives are introduced as indicated by arrows, the weft on the face is cut, forming a pile. It will, therefore, be seen that the face picks are produced by the weft floating over the warp, held down and made secure by a small proportion of the said warp; the lines of demarcation between the squares or figures being produced by depressed picks or weft held down by the warp, by which means an entirely new and effective appearance is produced in fustians.

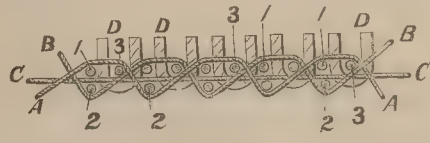
### IMPROVEMENTS IN THE MANUFACTURE OF BRUSSELS AND VELVET CARPETS.

This invention has for its object the production of a superior quality of, and the obtaining of increased scope for colours and designs in, Jacquard Brussels and velvet carpets, and, also, in some cases, the economizing of the figure warps. For these purposes, the counts of the cloth are arranged according to the following new combination, so that the count or pitch in the reed shall be about one half the count as woven, or, in other words, so that the number of wires or stitches woven, say, per inch, shall be about double the count or pitch per inch in the reed. The counts have previously been about the same both ways, but, by adopting the combination or relative counts above explained, an equal quantity of loops or pile upon the surface can be obtained with figure warps of about half the ordinary thickness or weight. This may be effected by having additional figure warps or frames, thereby increasing the scope of colours and designs, or by using only the ordinary number of figure warps or frames, whereby there will be a saving of material. Worsteds of heavier counts may, in some cases, be employed for the figure warps, the cost for spinning is thus less, and a further economy is thereby effected. In carrying out the invention, it is necessary first to decide the counts of the cloth that will be most advantageous to adopt. If it be desired to have a pitch in the reed or slay approximating in fineness to what is now used in making ordinary Brussels and velvet carpets, together with additional frames of colours, it would require jacquards to be constructed of greater scope than those now employed. To avoid this and to utilize the present jacquards, the pitch or count in the reed should be 132 dents to the usual width of 27 inches, that is to say, half the full pitch of the jacquard, viz.:—264. And as there are eight rows of needles in the five frame jacquards, with 132 needles in the row across the loom, each row with its harness cords may be used for operating the colours of one frame, that will thus give a scope of eight frames of colours, being three more than have been used before. In six frame jacquards, there are ten rows, so that a scope of ten frames can be obtained. With this pitch or count in the reed, which would be very nearly five to the inch, the number of stitches or wires as woven may be double the number, viz., ten to the inch, but these particular details may obviously be somewhat varied. The counts of the cloth having been decided, the drawing of the designs, the stamping or cutting of the cards for the jacquards, the adjustments of the loom, and the counts of the materials may all be adapted thereto according to the quality required to be produced. In drawing the designs for carrying out this invention, the cords or longitudinal rows should be of double width as compared with ordinary Brussels and velvet patterns, and the

number should be, say, 132 to 27 inches in width. The lashes or rows across from selvage to selvage may be as usual, and the number according to the length of design required. There may be as many as eight frames of colours introduced for production on five frame looms, and ten frames on six frame looms, and there may, of course, be any less number of frames for cheaper qualities. An increased scope of one or two additional frames could be obtained by altering the needles and lifting the boards of the present jacquards, but this would involve some expense and would probably never be required. The method of reading off the designs for stamping or cutting the cards is as follows:—The stamping machine has rows of holes in it to correspond with the rows of needles in the jacquard, and, in arranging the punches, they should be placed along the several rows of holes for the different frames, instead of counting from one row to another as in the ordinary method. The arrangement of the colours or figure warps for the different frames, and of the harness of the jacquard and reed or slay, may be carried out on the ordinary principle. The reed or slay will require to be made of the pitch employed, say 132, and the gears or heddles with the warps for binding and stuffing must correspond, but, in other respects, the loom may be arranged in the ordinary manner. Hitherto, in the thicker descriptions of velvet carpets made in Brussels looms, with the usual counts of the cloth, that is to say about the same, viz.:—five both ways, the figure warps have been of a thick woollen of about 25 to 30 yards per ounce, in order to ensure a sufficient quantity upon the surface, but, with this invention, they may be about half the thickness, and may consist of low numbers or of heavier counts of worsted, such as Nos. 8 and 9 tripled, instead of those finer ones used in the ordinary Brussels and velvet carpets, varying the counts and thickness according to the quality required. Heavier counts cost less for spinning than finer ones, and thus weight for weight a saving is effected. In some cases, it may be advantageous to use a finer woollen instead of the worsted above referred to. The loom having been prepared as explained, the weaving may be carried out in the ordinary manner.

## TUFTED PILE OR MOQUETTE CARPETS.

This invention is for the manufacture of tufted pile or moquette carpets, and other fabrics, woven on the royal Axminster loom, and it chiefly relates to a novel order of working, whereby the tufts of pile yarn are well bound into the body of the carpet, and, at the same time, the two linen chains or warps are enabled to be worked tight, and the pattern is made to appear on the back of the fabric. The following diagram




represents a longitudinal section of a piece of tufted pile or moquette carpet, woven according to this invention, the proportions of the various yarns being slightly exaggerated in order that their relative positions may be clearly understood. The heddle governing half of the foundation warp marked A is raised, and the other heddles governing the other half of the foundation warp marked B, and the dead or tight warp marked C are lowered, thus forming a cross of foundation warps A and B; the shot of weft (1) is then inserted above the dead or tight warp C, the lay comes forward and beats up this shot, the heddle governing the dead or tight warp C is raised, while the heddles governing the two halves, A B, of the foundation warp remain in their former position; a shot of weft (2) is then inserted under the dead warp C, and whilst this shot of weft is being inserted, a disc cutter is made in the usual manner to travel across, and cut off, the tufts of pile yarn previously put in. The three heddles, and, consequently, the foundation and dead warps are then all brought level, and the tubes, with bobbin of tuft or pile yarns, are caused to descend and insert the ends of tufts D through the foundation and dead warps, the heddle governing half A of the foundation of the warp is again raised, whilst the heddles governing B and C are lowered, a shot of weft (3) is then put across in the same shed as shot (1), all the heddles and warps are then again brought level and, when in such position, the comb brings the ends of tufts D up through the warps, and the lay beats up the shot of weft (3). The heddle governing half B of foundation warp is now raised, and the other heddles governing the other half A of foundation warp and the dead warp C are, at the same time, lowered, thus forming a crossing of foundation warps A and B, thereby firmly binding the shot of weft (3), which in turn securely binds the tufts D; in this position of the heddles and warps, a shot of weft (1) is inserted above the dead warp C, and so on as before described, except that the position of the foundation warps A B, with relation to the tight warp or chain, will necessarily be reversed for each row of tufts, as will be readily understood. It will be seen by reference to the diagram that the tufts D are bound by the ground or foundation warp, and not by the tight or dead warp. The cams used are those for operating the heddles through which the foundation warp is passed, and for operating the heddle through which the tight or dead warp is passed. On the periphery of one of the cams is formed another cam, which acts on a lever connected to, and operating, a light heddle or frame having two leashes, through which the selvage threads are passed, by which means the latter are so raised and lowered as to ensure their being properly bound in by the weft threads, Nos. 1 and 3. The various shots 1, 2, 3, of weft are respectively inserted when the trucks or rollers of the treadle levers are at certain positions on the several cams, and the tubes carrying the tufting or pile yarns are caused to descend through the warps when other said trucks or rollers are at the positions on the cams. In the manufacture of tufted pile or moquette carpets and other fabrics in this class of loom as conducted, four shots of weft are inserted to each row of tufts, but, according to this method of working, only three shots of weft are employed to each row of tufts. In order, however, to make as few alterations as possible in the loom, the cams are constructed to suit the movements of the loom, as hitherto arranged, to work four shots of weft to each row of tufts, and the various parts of the loom, except those described, are constructed and operated in the usual manner, but part of the cams for producing the various movements required in the loom are fixed differently, whilst others are fixed on the cam shaft, as usual, which latter makes one revolution for each row of tufting or pile threads inserted, and those cams which are fixed on the cam shaft are constructed of the same shape as when used to insert four shots of weft in each row of tufts, except that the needle-inserting cam is altered by filling up the space of the one shot, which is dispensed with in order to prevent the weft-inserting needle from going into the shed at such position; and the cam disc, whose cams give the beating up motion to the lay, has one of its cams removed, thereby causing the lay to beat up only three times to each row of tufts—this will have the effect of giving a longer pause between the insertion of shots Nos. 3 and 1, than was formerly given between shots Nos. 4 and 1, but this is of no importance, as the tuft spool is, during this pause, being put back into its place; the selvage shuttle will make the same number of motions as in a four shot loom, but every fourth motion is ineffective, as the shot of weft is omitted at that point. By altering the various movements and cams of the loom, other than those connected with the heddles, the patentee is enabled readily to change the loom, from his improved method of working, back to a four shot loom, by simply taking off the new cams and putting on the old ones, and by removing the filling piece from the weft inserting cam, and replacing the beating up cam.

## Causes of Insufficient Strength in Woollen Goods.

By K. L., in *Das Deutsche Woollen-Gewerbe.*

The woollen goods manufacturer has to contend with various disadvantages, which occasionally must cause him to lose much of his zeal in the manufacturing business. He naturally blames his assistants, who have to bear a large share of the responsibility for poor work. One of these drawbacks is the constantly increasing complaint about the insufficient strength of the cloth, and in order to grapple with this vexed question in an intelligent manner, it is necessary that the mill officials should give their undivided attention to ascertaining the source of the trouble. Let us first inquire how it happens that, especially of late, the want of strength in cloths is becoming so noticeable, to such an extent, indeed, that it almost seems as if the manufacturers of our day no longer understood how to produce as strong a fabric as formerly. It is well known that the goods manufactured by former generations were stronger and wore better, for the simple reason that manufacturers in those days, as a rule, had a better quality of wool than now. Again, they were in ignorance of the uses of wool substitutes—mungo, shoddy, &c., nor did they understand anything about the fulling on of flocks. It may be added that cloth consumers, in the good old times, did not demand so much as the swells of the present generation, and they were not so particular about the finish of the cloth. They were not then acquainted with that bane of the manufacturer, the dynamo-meter, and it is, therefore, highly probable that many a piece of cloth of inferior strength and quality slipped through with the better grades. No instructions as to a required strength expressed in kilogrammes could, at that time, be given by commission houses, while, at present, it is fair to presume that purchasers will sometimes make unreasonable demands concerning the weight of goods. Instances are not, by any means, rare where smooth-faced goods without a back, and of a weight of from 800 to 900 grammes [1 kilogramme=1,000 grammes=2 lb. 3¼ ozs.] are demanded, while, at the same time, the face is to be smooth and close, and of the best style of finish. It is not our intention to contend for, or against, the use of the dynamo-meter, although it is proved that it shows frequent deviations after several experiments with the same piece of cloth. Still, on the whole, in cannot be denied that the instrument has its advantages, chief of which is that it protects the conscientious manufacturer against fradulent competition by means of imitations. Various causes are attributed for the want of strength in that class of goods manufactured from wool as distinguished from worsteds. These causes may be separated into two categories, those due to insufficiency of the raw material itself, and those due to improper treatment in the manufacture of the cloth. We will begin with the former. A large portion of the raw wool material of the present day leaves much to be desired. It is well known that the rearing of the fleece, a product formerly tended with the utmost care for the manufacture of cloth, is now

greatly neglected. The breeding, feeding, and care of the sheep differ much from that of former times, even the treatment of the fleece before it reaches the hands of the manufacturer is not the same. The trouble of assorting the fleece carefully, according to the various parts of the body from which it is sheared, or the quality of the staple, is now usually dispensed with. The wool of each animal varies largely in strength and capacity of felting, according to the part of the body where it grew. Transatlantic wool, much of which is more carelessly raised than the domestic product, and maltreated in foreign wool scouring establishments, is not likely to be any stronger than our home wool. Much is to be expected of the Cape wool on account of its strong staple and curling capacity, but, in this brand, as well as in inferior grades, the defective lots increase from year to year. It is well known that many sheep breeders at the Cape, when they are in want of money, have their sheep shorn twice or three times a year, regardless of the season. On the other hand, it cannot be said that the large percentage of wool substitutes added to the clean wool is calculated to increase the strength of the cloth. In order to manufacture a good fabric, which shall comply with fair demands as to strength and quality, a sound and strong wool is first of all indispensable. The strength of a cloth is not alone due to the felting in the milling operation, although it may be an essential factor. The strength of the staple is a fundamental condition, and is fully as important a factor as its capacity for felting. Various kinds of wool full and felt very well, but it cannot be said that the strength of the cloth is materially increased thereby. Even under the most careful and rational manner of treatment, wool fibre suffers to a certain extent in the various processes of manufacture, and, for this reason, it becomes necessary, in order to produce a strong cloth, to use a staple of the highest degree of strength, so as to withstand the wear and tear of manufacture. Accordingly, the manufacturer or the superintendent of a woollen mill should possess a sufficient knowledge of wools, based upon practical experience, to enable him in the choice of the material, besides judging of its fineness, to sample its strength for certain grades of goods. Although the most careful treatment of the wool or the goods in the process of manufacture cannot supply the want of natural strength of the staple, yet, on the other hand, a careless and improper treatment may rob the strongest staple of its natural qualities and strength. The initial operations of the manufacturing process, the washing, scouring, dyeing, drying, &c., are frequently the first causes of the weakening of the fibre. Too strong a lye in proportion to the quality and composition of the yolk, too high a degree of temperature in the scouring bath, or both together, impair the staple, make its surface spongy, injure its natural strength, and deteriorate its felting capacity, by loosening and stripping off the horny serrature so necessary for the latter. The entangling and felting in the scouring and washing operations are also to be avoided as much as possible, because, felted fibres, instead of being separated and laid parallel, in the opening and carding processes, are simply torn into pieces in consequence of their matted condition. Another matter which must be duly considered as an important factor in the strength of wool, but which does not generally receive the attention it merits, is the degree of cleanliness of the wool. Cleanly washed wool dyes better, and, at the same time, does not require to be kept long in the dye kettle. It cards and spins better than unclean wool, the cloth manufactured from it fulls better, and takes a finer finish more easily. Although the assertion of some theorists that the yolk residue still adhering to the staple protects it against any injurious effects of boiling, mordanting, and the dye baths, may appear plausible at first glance, it may be accepted as well established by practical experience that badly washed wool, in spite of these residues, suffers more in the baths than the clean staple. It appears that, by the action of the mordanting baths, as well as of the chemicals and dye-stuffs used, the yolk is partly decomposed, and the ingredients attack the fibres. Practical men understand well the difficulty of spinning wool which contains yolk, now loaded with the residues from the last dye bath. It gums up the card clothing in the first place. Then the fuller knows that cloth manufactured from unclean wool felts with difficulty, because the still adhering yolk and dirt clog up the serratures of the surface, and thereby partly prevent the felting. It needs no further demonstration to prove that defects such as these must weaken the strength of the cloth. In dyeing, the wool can easily be injured by careless or improper treatment. This operation is the most critical stage in the whole process of manufacture, and it is no exaggeration to assert that, in the majority of cases, want of strength in cloth has had its origin in the dyehouse. The use of strong or unsuitable mordants, boiling too long or too violently, defective heating arrangements, where the dye kettle and vats are heated more on one side than on the other, are all factors that contribute to impair the structure and strength of the staple. Crowding the dye kettle with wool is another common error that does much harm. The wool is pressed together and cannot be handled. It is overheated, the temperature within the mass being always greater than at the surface exposed to the dye liquor. The dyer should load the kettle only with so much material as can be handled conveniently. It should move freely in the bath at all times. Diligent handling and turning contribute to equally distribute both mordant and dye-stuff, and keep the wool from lodging against the heated sides of the kettle. Especial care should be taken in cooling the wool after it has been withdrawn from the bath. There should be a room large enough for the wool to be spread out in a thin layer, and turned repeatedly. This must be done as quickly as possible, and the wool should not be packed into baskets or barrels until it is thoroughly cold. The statement is made that want of strength is especially noticeable in brown and dark coloured cloths, and that the lots of wool used for these colours suffered more than any others in the dyehouse. It is the browns with their various mordanting and dyeing processess that require the greatest attention from the dyer in order to prevent the wool from being ruined. Every carder and spinner knows that brown wool generally cards and spins badly, every weaver knows that brown yarn breaks very easily, and every fuller knows that brown cloth usually fulls with difficulty. It is well known that kettle colours as a class, even with the most careful treatment, attack wool more readily than vat colours. Lack of strength in white and vat blue goods, other conditions being equal, is comparatively rare. It is necessary, therefore, to use stronger grades of wool for those colours, and to be very careful in handling them when dyeing. The drying of the wool has no material effect upon the strength of the cloth. However, as wool dried in strong heat and insufficient ventilation becomes harsh and brittle, and breaks easily in the carding process, and requires more oil for lubricating, a gentle drying with plenty of ventilation is to be recommended. The oiling or lubricating of the wool before being carded is for the purpose of restoring its softness and pliability, which are partly lost by the washing and dyeing processes. It is obvious that wool dyed in the kettle must be abundantly lubricated, because it becomes so brittle during this operation. In other words, such wool requires more and a better oil than either undyed wool or that dyed at a low temperature (vat blue). It is the aim of the carding process to preserve the natural length of the staple and to lay it parallel, and not to tear it. This would occur if the material were insufficiently oiled. In proportion as the wool is torn in carding, the strength of the goods suffers. Insufficient oiling, or the use of an oil mixed with substitutes, such as semen psilli, coragheen, &c., in larger or smaller quantities, is always at the expense of the strength of the cloth, and a useless economy. Opening and carding wool in a moist condition also exerts an injurious influence upon it. The wool fibre when wet is not so strong as when it is dry. A cloth, which, when dry, could not be torn, will easily yield in a wet or even a moist condition. For this reason, wet or moist wool is torn much more in carding than when it is dry. Nor will wet wool absorb the lubricant as readily as dry. Naturally strong wool, scoured well, not felted, properly dried, and lubricated with good oil, will pass unimpaired through the carding process and come out all right. In the carding, two points which may exert an influence on the strength of the cloth are to be considered. The first is the position of the workers to each other and to the cylinder; and, the second, the condition of the card clothing. If the rollers are too close, the material, instead of being well carded, is torn and chopped. When they stand too open, the wool is insufficiently carded and remains partly unopened, which will always have a bad effect upon the felting and, therefore, upon the strength of the cloth. Faulty carding also occurs when the clothing is either in a bad condition or it is not cleaned often enough. Frequent and thorough cleaning of the cards is essential in order to obtain well carded wool. After the carding and preparation of the sliver, we enter the spinning room, and find that the twist of yarn is an important factor affecting the strength of the cloth. It is obvious that, with the number of twists and the thickness of the yarn, the strength of the latter increases, although this does not always favour the strength of the cloth. The quantity of the twist in the yarn, especially for the filling, depends always upon the character of the cloth and the pattern to be produced. While filling with open twist for napped goods produces a heavy, close face, hard-twisted filling gives an empty, open face. In the case of warp yarn, which receives more twist than the filling, the quantity of the twist is limited by the subsequent operations of fulling and finishing. It must be borne in mind that increasing the twist of the yarn decreases its fulling capacity, because, more fibre ends are twisted into the interior of the thread, and they cannot interlock so easily. To obtain a satisfactory filling—interlocking—of the single fibres, a certain degree of free movement is required. They must be able to slide into and entwine with each other. Too hard a twist of the yarn renders this difficult. Therefore, what is gained by the greater twist of the yarn is lost in the impaired capacity for felting of the cloth. For this reason, it sometimes happens that cloth in the warp is hardly any stronger, and perhaps not so strong as in the filling, despite the greater twist of the former. The closeness of the warp in weaving is, of course, a prominent factor. It must be of such a nature that the weave, in the two directions (length and breadth) obtains sufficient closure. If, for instance, it was desired to use a cleanly spun warp, but drawn in wide, the weave would then be nicely closed in the direction of breadth, and be sufficiently strong. In the direction of the warp, however, both these qualities would be lacking. In order to equalize the difference, either more warp must be placed in or else the ends must be thicker. This would increase the closure and strength in the direction of the warp, but decrease it in the filling, since the space then occupied by the heavier warp, either in number of ends or their greater thickness, is not filled by the filling, in consequence of which, less of it can be shot in. In the reverse case, when there is want of closure and strength in the direction of filling, and an increase in that of the warp, the space required for the warp is deducted from the filling, whereby, the latter cannot be shot in as close as the weave requires. The weave would be much less close in the filling than that in the warp, so that the low number of picks would not be sufficient to give the weave

in this direction the desired strength. In this particular also the fulling has to be considered. An overcrowding of the weave with yarn, either in the warp or in the filling, would require a longer time of fulling, and, under certain circumstances, so much longer that the cloth would thereby be damaged in the milling. The consideration of this point is of the utmost importance to the cloth manufacturer. The closeness and proportion of warp and filling, the run of yarn and proportions of crossing, the spinning and fulling capacity, as well as the strength of the raw material, are all matters which require great knowledge and practical experience on the part of the manufacturer. No definite rules can be established concerning these points, in view of the widely varying factors controlling each case. Especial attention is called to the fact that in each satin weave the warp dominates; in consequence of this, the filling may consist of an inferior material, but its staple must never be short, as the strength in the direction of breadth depends upon it. The essential condition for the manufacture of a strong cloth is to weave it as well and as closely as possible. A loosely woven cloth will, in spite of the best fulling, never be as strong as one that is closely woven. If due consideration has been paid to the different stages in the manufacture, such as choice of material, its treatment, and the correct proportion between run of yarn, warp and filling, the fulling process will offer no difficulties, provided the fuller understands his business. The use of unduly strong alkaline solutions in scouring and fulling, as well as fulling too hot, weaken the cloth more or less. It has been remarked previously that alkalies, in strong solution, attack the wool. Strong alkaline solutions impair, not only the strength of the staple but, its felting capacity. The strength of the lyes used for washing and fulling should be carefully ascertained with a hydrometer. The soda lye, the use of which for fulling is now being abandoned, employed for scouring the cloth, should not be more than 2°, at most 2½° B. strong. For cloth from clean wool lubricated with good oil a lye 2° strong is fully sufficient. In practice, other factors must also be considered, such as the degree of cleanliness of the wool, and the greater or lesser tendency of the lubricant to saponify. Cloth manufactured from dirty wool occasions difficulties in all the stages of the dyeing process, especially in the washing and fulling, in which oil, dirt, and lyes are removed only with difficulty, and then not thoroughly, even by the use of the strongest lyes. In removing inferior oils, unduly strong lye is often necessary. It is not strange, then, that the strength of cloth is so often impaired. Long continued fulling causes the cloth to run hot, and often it is fulled for days and subjected to experiments until it becomes soggy and rotten. Too hot fulling also occurs when the fuller does not keep the cloth moist enough. It is also sometimes due to the faulty construction of the fulling machine. It is frequently observed that a piece of cloth, which is to be tested for its strength, is weaker at the two ends than at all other places. This is unfortunate, for the swatches to be tested are usually cut from the two ends. This, however, is easily explained. The seam, which connects the two ends of the piece, as soon as it enters the rollers of the fulling machine, crowds them apart. Hence they not only receive greater wear, but, by reason of the seam, they do not receive the same quantity of kneading as the other parts, which is so necessary for a good felting. It is advisable, since the seam cannot be dispensed with, not to lap the ends over each other, but to join them end to end, and to use fine sewing thread, to make the seam no thicker than is absolutely necessary. Finally, the cloth may lose its strength by reason of too violent teaseling. It is plain that the loosening and roughening of the felt, even by moderate teaseling, must affect the strength of the cloth, because the closure of the felt, which is loosened almost completely upon the one side, contributes not a little to the strength of the fulled goods. Great care is, therefore, necessary in this operation, and the finisher must know exactly how deep he can go, without injury to the cloth. A deep teaseling, of course, is sometimes necessary for the production of a soft and elegant nap so indispensable for the finer grades of goods. Such a cloth should issue strong from the fulling mill, so that, in spite of thorough teaseling, it will still possess sufficient strength. The operator can, by careful treatment and choice of teasels, contribute to the preservation of the cloth, even when sharp teaseling is required, by teaseling with two sets rather than to shorten the operation by using sharp teasels. For this, of course, he must be allowed the necessary time.

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The Government of the Mexican State of Sinaloa has just promulgated a decree by the terms of which the following bounties will be given to the first products of the first factories established in the state. Bounties of 1,000 piastres when the capital employed in machinery and buildings will be at the least 10,000 piastres. Bounties of 2,000 piastres for a capital of 20,000 piastres; of 3,000 piastres for a capital of 30,000 piastres; of 4,000 piastres for a capital of 40,000 piastres; of 5,000 piastres for a capital of 50,000 piastres; of 10,000 piastres for a capital of 100,000 piastres; and of 20,000 piastres for a capital of 200,000 piastres. Amongst the new industries to which these bounties will be granted are the following:—Factory for cow-hides, waxed skins and moroccos; for stockings or cotton hose; for madapolam and white cotton cambric muslins; for printed cotton tissues, and for the extraction of henequin fibre. For the last industry, the bounty will be 500 piastres for the first 1,000 quintals, and 400 and 300 piastres respectively for the second and third 1,000 quintals of fibre extracted in establishments situated at a distance of 20 leagues from each other.

## Fulling and Scouring Soap—Make your own Soap.

The composition and manufacture of fulling and scouring soaps is the only subject which now remains in our consideration of this first operation of wet finishing, viz, the fulling process. We have already looked into the fulling mills or machines, the flocking, the calculations, and the treatment of pattern sheets, and now we have reached a point where all finishers have their own ideas, and where each man usually thinks his own opinions are the very best. All we can do is to lay before our readers the few important facts of our own experience, and then allow each to think or act just as best suits his own convenience. So numerous and so widespread are the uses and varieties of the article in question that it is no wonder that the finisher is often at a loss to know just what is best to do, and it is only after repeated and costly experiments that he arrives at any decision at all. If it so happens that a finisher is purchasing a good reliable soap from a honourable firm, and knows for a certainty that each batch will open up just like the last, then, indeed, he has little to trouble him as regards either its manufacture or its ingredients. But even if he has a soap which is absolutely reliable, the question then arises is the course he is pursuing actually the cheapest, the safest, and the best? To this question there will be doubtless a diversity of replies, and all will be influenced more or less by circumstances, but our experience in the long run has been that under ordinary conditions it is cheaper and safer for the finisher to buy his raw ingredients and manufacture his own soap rather than to buy it already prepared. It matters not how well we may like a certain brand on trial, unless we can depend upon its being always uniform, we are apt to run the risk of causing damage and loss which will be irreparable. And more than this, we can hardly expect the cheaper manufactured soaps to contain absolutely nothing but pure and useful ingredients, and hence it is that we are apt to find such soaps diluted or adulterated to a greater or less degree. It is then often hard to trust to such a soap even for ordinary use, and, in the end, it may turn out to be far dearer than the home made article, the composition and ingredients of which we know for a certainty to be just the substances we have used. There are, then, several real advantages to be gained by the finisher who makes his own soaps. In the first place, he obtains in this way an absolutely pure soap, containing no useless nor foreign ingredients whatever. In the second place, he effects a very appreciable saving in the cost of his soaps, since it is much cheaper to buy the materials and make the soap, than it is to buy it already prepared. Then, when we manufacture our own soaps, we should always try to make them in such a way that there is no waste of material, or so that every particle of the ingredients helps to carry out the true functions of soap. All matters added simply to increase weight and bulk are so much waste materials which can be of no possible use to the finisher, and which, although they may not hinder the true action of the combination, do not in anyway stimulate or increase the action. As to the soaps used in fulling, much depends upon the kind of oils which are used in the preparation of the stock, and, also, it may be said that the kind of soaps employed in that same preparation exercises more or less influence on the fulling soap best suited for the case. Usually, where red lard oil is used, six ounces of a good fulling soap and two ounces of soda ash to the gallon should be enough to start the grease well and, at the same time, not to destroy the colours. In order to full quickly and easily, it is necessary to use a fair alkali. If goods require long fulling, the results will be more satisfactory with the use of more alkali than when short fulling is required. The soap and alkali perform a most important part in the fulling process, and it is all important that they should be as nearly as possible uniform in quality and in strength. In buying an alkali, always be sure it is of the same strength as that previously in use. Take a pound of the new alkali and dissolve it in a quart of water, and then see what it will stand. Each new lot should be tested in this same way if trouble is to be avoided. There are two great kinds of soaps, each of which has its own especial claims upon the fuller and finisher—the soda and the potash soaps. Some prefer one and some the other. We will, for the present, pass over the arguments either for or against the different kinds of soaps, and take up at once the methods of manufacture, and, from the few remarks which will follow, we consider it possible for any finisher to make his own soaps at less expense and at less risk than he can buy them. There are two methods which may be followed in the manufacture of soda soaps. First, the boiling process, in which the combination of the various ingredients, namely, tallow or oil and soda, is brought about by the agency of heat; and secondly, the cold process, in which the tallow is combined with the soda in the form of lye made from fine powdered caustic soda, at a normal temperature. We all know that the former of these two processes is the older, but we think that a glance at the methods of procedure in either case will reveal the fact that, in reality, it is less preferable than the latter and more modern method. In the first, or boiling process, the soda is dissolved in water and reduced to a weak lye from 15 to 20 degrees Twaddle. This lye is causticised by boiling it with lime. Then the weak lye is boiled with the tallow or oil in a tank, first at its normal strength, and then, in the latter part of the operation, partly concentrated. In this way, the complete saponification of the grease is accomplished. The separation of the soap from the impurities which exist in the soda ash is then brought about by the use of a small quantity of common salt. These impurities pass away in the spent lyes, but, at the same time, along with this a most valuable

ingredient is lost, namely, the glycerine, which, in some cases, amounts to 7 or 8 per cent. of the tallow or oil used. Herein lies one of the most serious objections to the oil boiling process of soap making. The glycerine is too valuable an ingredient to be wasted in this way, and any process which will save it to the manufacturer should be at once adopted. The first and positive essential in the second or cold process of soap making is an absolutely pure caustic lye. If there is any variation whatever from a perfect standard, in this respect the result will be evident in soap either too weak or too strong, and the manufacture of a pure neutral soap cannot possibly be effected. There was a time when it was impossible to obtain an absolutely pure caustic soda, but now its manufacture has become so extensive that it is possible to obtain a double refined, powdered, 98 per cent. caustic soda, always uniform and, hence, always producing like results. The older article which was put up and sold in drums is much inferior to this in every particular; and experiments will soon show the statement to be a fact. The new article is more easily handled, dissolves more readily in cold water, and will keep without melting away. We will give directions for the manufacture of a hard soda soap which will be found very good for most fulling purposes. We shall obtain a strong soda lye by using 20 pounds of pure powdered caustic soda in 90 pounds (9 gallons) of soft water, stirring up once or twice and allowing to cool. This lye stands at about 80° F. Now heat 150 pounds of tallow or grease until it liquefies and reaches a temperature of about 120° F. When this tallow is ready, pour a continuous stream of the lye slowly into the tallow, at the same time slowly stirring until both tallow and lye combine. Great care must be taken in the stirring, from 15 to 20 minutes being quite sufficient to bring about the combination. This stirring, if unduly prolonged, will cause the separation of the lye and oil, which is just the opposite of the desired result. Pour the mixture off when the combination is complete, and allow it to stand in the moulds in a warm place for two or three days. 200 pounds of a hard white soap will result from this operation, which will be all the better for use if allowed to stand for two or three weeks. This soap, if all the directions be carefully carried out, will be perfectly free from impurities and useless ingredients, and we know then just what we are using on our cloth. If an alkali is used along with this soap, sal soda is the best form that can be employed. We have here pointed out the two methods of making soda soaps, and it is clearly seen that, in the latter case, we have, as the resulting combination, a soap that is perfectly pure and absolutely free from every useless adulteration. And this result, it will be seen later on when we consider prices, has been attained at a comparatively low figure. But the most important point of all is this—we know exactly what we are using, and can rest assured that we are getting full value in the shape of a safe and reliable soap for all the money laid out in its manufacture; and we feel that it must be admitted that we can hardly say this in every case where soap is purchased already prepared. As to the adulterations which often appear in the cheap soaps with which the market is occasionally overrun, we may say a word or two. In the first place, a pure soap is nothing more nor less than a combination, in the correct proportions, of a fat, animal or vegetable oil, with pure caustic soda or caustic potash. Such it is that constitutes a pure soap, and any other substance whatever which a soap may contain, excepting the glycerine retained in the cold process of manufacture, is an adulteration, and is just so far both useless and unnecessary. The chief adulterations of soda soaps are silicate of soda, resin, china clay, silex, potato flour, glauber salts, and sal soda. The main reason why these articles are so commonly in use for the purposes of adulteration is that they are each much cheaper than the cheapest soaps. There is, no doubt, an advantage in the case of the two last named articles, but, still, when the consumer pays the price of a soap for a free alkali, he would surely be making money to try his alkali separately, and pay for it only what it is worth.

Potash Soaps.—Having spoken of the composition and methods of manufacture of the hard or soda fulling and scouring soaps, we purpose taking up, in a similar way, the soft or potash fulling and scouring soaps. These soft soaps are commonly known as "fig" or "crown" soaps, and they are considered by most successful manufacturers and finishers to be, in many respects, far superior to the hard soaps for all purposes of fulling and scouring woollen goods. It is a well-known fact that the action of potash on the fibre is quite different from that of the soda. Potash lubricates the fibre and makes it soft and silky, while soda rather hardens it and renders it brittle, at the same time imparting to it a yellowish tinge. We may be wrong, but it is our impression that potash soap is not so generally in use for fulling and scouring as the hard or soda soaps, and yet it cannot be denied that it possesses properties and advantages which cannot be altogether set aside. As regards the manufacture of a pure potash soap, we must say that it is all important to start from the same basis as in the soda soaps, and to have at hand an absolutely pure caustic potash, perfectly free from all foreign ingredients whatsoever, and especially free from soda in any of its forms. As in the case of caustic soda, so with potash, it is now possible to obtain such a basis in the shape of a pure potash from which a caustic potash lye, perfectly pure, may be obtained, by simply dissolving it in water. Then the soap may be made by following out the directions below. Before, however, going into these directions, we would say that it is possible to make potash soap, by the old boiling process, in a manner very similar to that laid down for the manufacture of soda soap. But, since the cold process is so much the simpler of the two methods, and, at the same time, so much superior and, in every way, preferable in practice, we will omit the details in the boiling process, and proceed at once with the cold process of manufacture. Dissolve, by stirring once or twice in an earthenware vessel, 50 pounds of pure caustic potash in 50 pounds (five gallons) of water. The solution at once takes place and the liquid becomes hot. Allow this to cool down to 80° F. Next, mix together in another vessel, say, 20 gallons of cotton seed oil and 20 pounds of clean melted tallow. After this is ready, pour the lye into the oil in a continuous and gradual stream, slowly stirring, at the same time, until the combination is entirely complete. Then cover up the whole for a day or two before using, and, if possible, allow to stand for a couple of weeks, and the soap will be all the better for it. In this way is produced 300 pounds of highly concentrated soap, which may be made stronger, if necessary, by the addition of a small quantity of refined pearl ash. If desired that the soap shall be still stronger, use less of the oil in its manufacture, or, what is better still, add a larger quantity of crystalline carbonate of potash when the soap is used in the washers or mills. It must be remembered that this soap will be very much more concentrated than is the ordinary soft soap of commerce. The way to make it more like that which we get when we purchase our soap from the boilers is to add about a pound of water to every three pounds of soap, and then heat gently until their mixture is completely effected. This will produce a clear, stiff soap, which will greatly improve on standing some days, or even weeks, before using. We would just add that cotton seed oil is the best to use in either the cold or boiling process. Why this is so we cannot say. Still, tallow or grease can be used together, and they will produce a soap which will be found satisfactory for both fulling and scouring purposes. It is seen from the above directions that soft, or potash soap, may be made of any desired strength by the use of more or less caustic potash in its manufacture, or, by the addition of pearl ash at the end of the process. But we would make this point most emphatic—soda ash, or any form of soda whatever, should never be used along with potash soap, since the soda counteracts and destroys all the special and peculiar advantages to be derived from the use of potash soap in the operations of the finishing department. As to the adulterations in use in the manufacture of potash soaps, we find them almost as numerous as those mentioned before in soda soaps. There is always to be found in every potash soap the impurities which exist in the lye used, when that lye is made from wood ashes. Since these cannot be carried away in the spent lye, as in the case of hard soap, they must remain in the composition, unless, as we said before, a perfectly pure potash is obtained rather than the kind which is most commonly at the hands of the soap manufacturers. Other adulterants, more or less common, are soda, silicate of soda, and potash, resin, and potato starch. In fact, any substance which possesses the power of increasing the amount of water that can be used, without materially affecting the appearance and consistence of the soap, is always valuable in this particular line. Soda, as an adulterant, is not used except in warm weather, when it does not harden the soap as perceptibly as at a colder temperature. It is cheaper than potash, and, to equal weights, it will saponify half as much again of oil or grease as potash will. And, more than all, this soda soap will take four times as much water as potash, and yet be of the very same consistence. Resin is used in the place of tallow, and is much cheaper, but, still, it is plain that it can never fill the place of tallow, so far as its usefulness and value are concerned. Silicate of soda and potash only serve to harden the fibre, and make it brittle, while potato starch increases the amount of water which the soap can hold.—*Boston Journal of Commerce.*

*(To be continued).*

## Austrian Exhibition of Tapestry.

The Austrian museum in Vienna has resolved to arrange next spring a loan exhibition of tapestry works, and the proprietor of one of the richest collections of Gobelins, the Austrian court, has already promised to exhibit choice pieces of Flemish tapestries, probably the same with which the walls of the great reception and ball rooms in the Hofburg are covered on very great occasions. The connoisseur will be delighted if only these celebrated pieces are open for careful inspection, but the Austrian museum is also sure to receive many valuable objects from a number of aristocratic families, from monasteries, churches, and private collectors. Every sort of artistic tapestry, if destined to cover walls, will be admitted, and the museum is already promised works of Flemish, Italian, German and French art, which cover distinct periods of the Middle Age, the *Renaissance*, and the modern time. The museum invites, also, to send to the exhibition modern imitations and copies of old works which, if possible, will be exhibited side by side with the originals The exhibition promises to be not less interesting than the Maria Theresa exhibition of last year, and the Goldsmith exhibition of this year.

Neyanda fibre is the produce of a species of the lily family, and is indigenous to tropical climates, being chiefly confined to India and Ceylon. This fibre much resembles flax, and may be generally substituted for flax.

## Original Designs.

On our fiast plate, we give a Curtain design which is suitable for Lace, Tapestry, or Printed Goods.

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On our second, will be seen a design for a Mantle Cloth, which is also in the style fashionable for Dress Goods.

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On the third plate, there is another Curtain design for either Tapestry or Printed Goods.

## Monthly Trade Reports.

WOOL.—At the London wool sales, the biddings have been made with much spirit, and a firm tone has, since the opening, characterised the operations. Prices have advanced, but, in face of this, the various lots have been bought with eagerness. French and German buyers have competed keenly with English purchasers, and have taken a large bulk of the wools. In the Yorkshire districts, dealers in wools have been very firm in their quotations and, as a consequence, buying has mostly been for present requirements. As to speculation, there has been little. The yarn trade has only been quiet, spinners having been unable to procure prices proportionate with the advance in wools, and, as merchants have held any orders they have had to give, a quietness has prevailed in this branch. Still, spinners are generally working full time on orders in hand, preferring to run these out before taking hold of new business. The piece trade has been about the average, the demand being greatest for lustre goods, which seem to have come to the front recently.

COTTON.— The busy aspect of business during October has been succeeded by a rather quieter state of things in the various branches of the cotton industry, but there has been an appearance of firmness. The demand for the raw material has ruled steady, and this seems likely to continue for some weeks to come. The yarn markets have been firm throughout the month. Spinners of nearly all ranges and counts are, on the whole, well supplied with orders. A considerable proportion of these was taken during October, however, and the new business concluded in November has certainly not equalled the rate of production. The supply of medium counts is likely to receive an appreciable addition in the early months of next year, but spinners do not appear to anticipate any serious lessening of their margin from this cause. The demand for cloths has been about an average for the home trade, whilst that for China and Japan has been very weak throughout the month. India merchants have followed up their extensive purchases during October in a rather languid and hesitating manner, though, in a few instances, they would have done more if they could have obtained delivery within a moderate interval. The business for the South American markets has been interrupted by the revolution in Brazil, but, even for this market, free deliveries have been made towards contracts previously entered into, and the apparently peaceful and smooth course of the political change in Brazil is inducing a cautious resumption of business for that country. Prices have varied but little in any branch.

WOOLLEN.—A very cheerful tone has ruled in nearly all branches of the woollen trade during the month, and, taking into account the time of the year, trade was never so brisk. The demand for worsteds, especially the finer makes, is as large as ever, and there seem to be no signs of any falling off in this branch for some time to come. As regards woollens, the best qualities and, in a lesser degree, the medium kinds, have received much attention, and, from the new patterns now being produced and shewn, large orders are confidently expected. In fabrics for the clothing trade, the demand has also been good, and the same may be said of overcoatings generally, and of Meltons in particular, for which many repeat orders have recently been taken. Prices of nearly all classes have been firmer, with a tendency upwards, and, in face of this, orders have come in very freely.

LINEN.—In most branches of the linen trade, quietness has prevailed, the only exception, perhaps, being in sheetings, bed-tickings, and, also, in narrow goods of a fancy description as regards design and colourings. In towellings and domestic cloths of a narrow make, there has, on the whole, been a favourable business done as to the number of orders, yet the prices have been generally low, the same being the case in nearly all classes of linens. The demand for fine damasks and bed linens has only been quiet, there having been little done with America recently, a country which has been a good customer formerly. The unsettled state of Brazil has also had its effect on some classes of linens, but hopes are entertained of news of a satisfactory nature reviving the demand for that country.

LACE.—A languid feeling has characterised the lace trade generally, with, perhaps, the exception of plainer embroideries and Valenciennes and Brabant goods, these have received a fair amount of attention. Curtains, window blinds, and furniture laces, have also had a fair demand, but the production of these is large. The bobbin net branch has been very quiet, and the same may be said of silk tulles and spotted nets. In cotton millinery laces, anything of a really novel character has sold well, but ordinary kinds have been neglected. Quotations have kept about the same as for the past few weeks. Orders generally for any description are small.

## Parcel Post.

India.—Parcels addressed to any place in India, including Burmah, or to Aden, are accepted for insurance at any post office in the United Kingdom, and those addressed to the United Kingdom are accepted at any post office in India.

Uruguay and Tahiti.—Parcels are now accepted at any post office in the United Kingdom for transmission to Uruguay, *via* France or Germany, and to Tahiti, *via* France. Uruguay:—The charge for a parcel not exceeding 3 lbs. is 4s. 7d.; exceeding 3 lbs. but not exceeding 7 lbs. is 5s. 1d. The delivery of parcels in Uruguay is confined to the following towns:—Canelones, Duranzo, Florida, Fray Bentos, Mercedes, Minas, Monte Video, Paysandu, Salto, San José. No parcel can be transmitted which is not addressed to one of these places. Greatest length, 2 ft.; greatest length and girth combined, 4 ft. Tahiti:—The charge for a parcel not exceeding 3 lbs. is 5s. 8d.; exceeding 3 lbs. but not exceeding 7 lbs., 6s. 1d.

Mayotte, Nossi-Be, Diego-Suarez, and St. Mary (Madagascar):—The postage on parcels for these places has been reduced to the following rates:—For a parcel not exceeding 3 lbs., 3s. 2d.; exceeding 3 lbs. but not exceeding 7 lbs., 3s. 7d.—*Board of Trade Journal.*

## The Silk Industry of Trebizond.

The silk manufactures of Trebizond consist of three descriptions:—*(a) Tcharchaf* or cloaks worn by ladies for out-door costumes. *(b) Pechtemal*, or table covers of light texture, figured with wide stripes of various colours. *(c) Kefies*, or sashes of striped stuff, figured and fringed. *Tcharchaf* are of three kinds:—white with a large violet border of a strong material; horizontal and vertical stripes forming checks of a light texture; and those of one colour, generally violet or black, made of ordinary material. The last kind is not so extensively manufactured as the first two sorts. The white *tcharchaf* are the most highly considered, and are sold at prices varying from 300 to 350 piastres each (the piastre is about 2·16d.) and the two other kinds realise prices from 222 piastres to 240 piastres. The difference in the prices depend on the quality and quantity of the material; thus, for example, the tissues in the first two categories weigh from 200 to 250 drachmes (the drachme equals ¼th of an ounce), whilst those in the third category weigh only from 160 to 170 drachmes. These tissues are composed of two pieces of stuff, each measuring 2 metres long and one metre broad. The *kefies*, the production of which is small, are sold at prices ranging from 40 to 50 piastres each. The consumption is somewhat limited by reason of the adoption of European costumes by the female portion of the community. This industry appears to be doomed, as in the case of the manufacture of silk lace, which has fallen out of fashion and has been replaced by similar products of European manufacture.—*Journal de la Chambre de Commerce de Constantinople.*

The Central Society of Professional Labour has proposed to develop the organisation, already commenced by it at Paris, of an industrial and commercial museum. A large number of exhibits has already been collected in the galleries of the Commercial High School, placed at its disposal by the Paris Chamber of Commerce, while a special locale will be devoted to this object in the very centre of the capital, and within reach of all visitors. It is a museum destined to be of great service to merchants, manufacturers, and producers of every country, by facilitating the means of putting themselves in direct communication with the consumers. In the galleries will be exhibited the products, merchandise, and articles coming from the various foreign countries, and the visitor can judge on the spot of their quality and of their value, without having recourse to any intermediary. Already numerous foreign exhibitors, realising the usefulness of this institution, and the large interest which they have in being gratuitously represented in Paris, have made very handsome gifts to it. All information and communications are to be addressed "à M. le Président de la Société centrale du Travail professionnel, 38, Avenue de l'Opéra, Paris."

Ensinoleum is the name of a new product patented in France, and which is supposed to possess very valuable properties for the oiling of the wool previous to the spinning process. It is a solution composed of glycerine soap in water, to which a certain amount of sodium carbonate has been added. It is stated that wool so treated requires no scouring afterwards for freeing the fibre of the oil, which is now generally employed for the purpose.

CURTAIN.

MANTLE CLOTH.

CURTAIN.

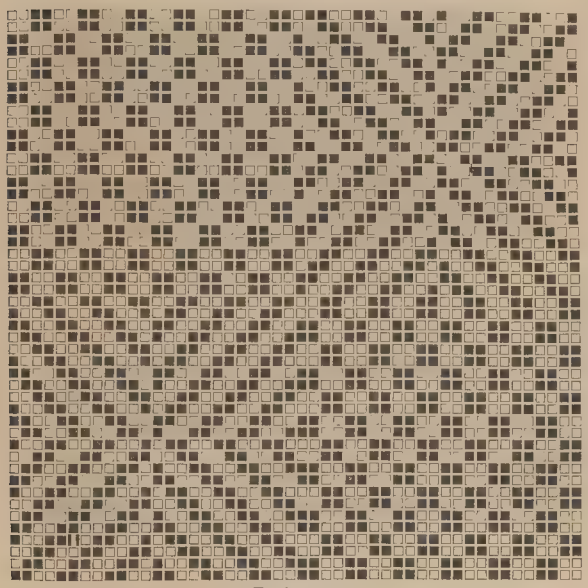
# FASHIONABLE DESIGNS.

* * * * * A Supplement, containing Woven Specimens of the Designs given on this page, is presented each month to those of our Subscribers who manufacture Cloth for Ladies' and Gentlemen's wear.

Ours was the first Journal in this country to give woven samples of various descriptions of fabrics regularly each month, and since we commenced this feature, some years ago, it has, to some extent, been adopted by others. In all matters connected with every branch of designing, we stand ahead of all other Journals.

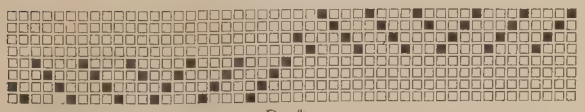
## Woollen Suiting.

No. 614.



Design.

Pegging Plan.



Draft.

| Weft :— | | | Warp :— | | |
|---|---|---|---|---|---|
| Ends. | | | Picks. | | |
| 2 Twist, | 15 skeins. | | 2 Twist, | 15 skeins. | |
| 1 Blue, | 9 ,, | | 1 Blue, | 8 ,, | |
| 4 Black, | 9 ,, | Twice. | 4 Black, | 8 ,, | 5 times. |
| 4 Blue, | 9 ,, | | 4 Blue, | 8 ,, | |
| 4 Black, | 9 ,, | | 4 Black, | 8 ,, | |
| 1 Blue, | 9 ,, | | 1 Blue, | 8 ,, | |
| 24 ends in pattern. | | | 48 picks per pattern. | | |

Repeated twice, second time with different coloured twist, making 48 ends in pattern.

1,960 ends in warp; 30 ends per inch; 7½ reed; 4 in a reed; 30 picks per inch; 64½ inches wide in loom; 56 inches wide when finished. Weight, 27 ounces.

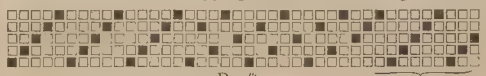
## Worsted Trousering.

No. 615.

Design.

| Ends. | Warp :— | |
|---|---|---|
| 3 Twist, | 2/30's worsted. | |
| 7 Black, | ,, | 5,376 ends in warp; |
| 5 Slate, | ,, | 84 ends per inch; 10½ reed, |
| 15 Black, | ,, | 4 ends in a reed; 32 picks |
| 5 Slate, | ,, | per inch; 64 inches wide in |
| 7 Black, | ,, | loom; 56 inches wide when |
| 3 Twist, | ,, | finished. 20½ oz. cloth. |
| 15 Brown, | ,, | |
| 60 ends in pattern. | | Weft, all Black, 12 skeins |

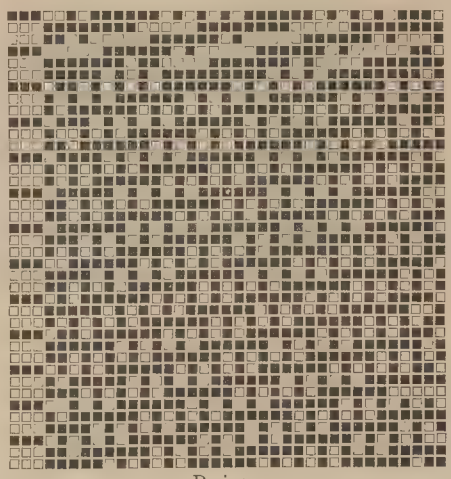
Pegging Plan. 3 times.



Draft. 3 times.

## Worsted Suiting.

No. 616.



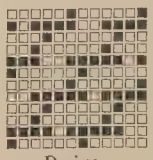
Design.

5,040 ends in warp; 78 ends per inch; 13's seed, 6 ends in a reed; 94 picks per inch; 63½ inches wide in loom; 56 inches wide when finished. 19½ oz. cloth.

Warp, 2/30's worsted. Weft, 15's worsted.

## Woollen Suiting.

No. 617.



Design.

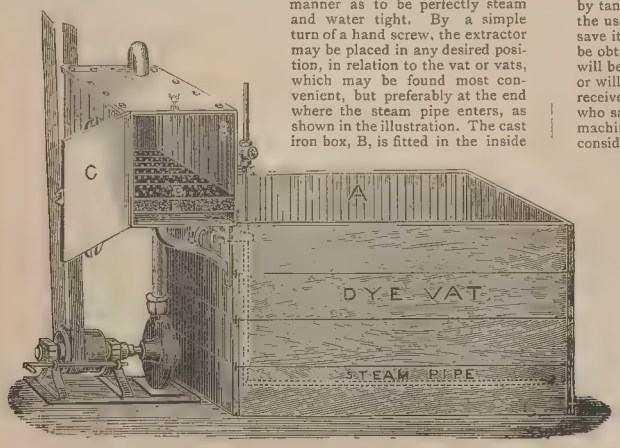
| Ends. | Warp :— | Picks. | Weft :— | |
|---|---|---|---|---|
| 3 Red, | 27 skeins. | 1 Twist, | 27 skeins | 6 times. |
| 10 Slate, | ,, | 1 Brown, | ,, | |
| 20 Brown, | ,, | 1 Twist, | ,, | |
| 7 Black, | ,, | 9 Slate, | ,, | |
| | | 1 Red, | ,, | |
| 40 ends in pattern. | | 8 Black, | ,, | |
| | | 36 picks in pattern. | | |

4,480 ends in warp; 70 ends per inch; 8¾ reed, 8 ends in a reed: 76 picks per inch; 64 inches wide in loom; 56 inches wide when finished. 20½ oz. cloth.

# MACHINERY, &c.

## Rhodes's Patent Gravitation Dye Wood Extractor.

Our attention has been drawn to the Patent Gravitation Dye Wood Extractor, illustrated below. It is the invention of a practical dyer, and, in our opinion, is well worthy the attention of all users of logwood, tanners' bark, myrabolams, &c. It not only extracts colouring matter from dye-woods, but, at the same time, entirely prevents even the finest particles of wood from penetrating the dye vat. By reference to the illustration, the mechanism of the machine will be easily understood. An ordinary open dye vat, A, is fitted with the usual perforated steam pipe. The extractor consists of a cast iron box, B, made of plates, after the manner of an ordinary steam chest, having a hinged door, C, which is fitted in such a manner as to be perfectly steam and water tight. By a simple turn of a hand screw, the extractor may be placed in any desired position, in relation to the vat or vats, which may be found most convenient, but preferably at the end where the steam pipe enters, as shown in the illustration. The cast iron box, B, is fitted in the inside




*Rhodes's Patent Gravitation Dye Wood Extractor.*

with two ledges near the bottom, upon which two perforated iron plates, D, slide, one above the other, sufficient space being allowed between them to place the filtering arrangement, E, consisting of a canvas and straw mattress, which is easily removed and cleaned. This is a most simple arrangement, and has been adopted by the patentee as the cheapest and most effectual, after exhaustive experiments had been made with asbestos and other more expensive materials. The dye liquor is conducted from the bottom of the dye vat into the top of the extractor by a centrifugal pump, F, worked by a one-inch belt. Where the small amount of power required to work the pump is not available, an injector arrangement of a simple description may be substituted, but the centrifugal pump is preferred on account of the extra pressure obtained thereby in the extracting chambers. After penetrating the logwood and filtering mattress, the liquor passes through the outlet pipe, G, into the dye vat. This outlet pipe may be continued down like the steam pipe, and perforated along the bottom of the dye vat. The process of extracting is as follows:—The logwood is thrown into the chamber, the door closed, and the screw tightened by the hand. The pump, or injector, is then set in motion. A pressure of about 6 lbs. per square inch is obtained in the chamber, entirely extracting the whole of the colouring matter from the logwood in half the time necessary for the old process of boiling in the bags. The liquor is then forced through the filtering mattress and along the outlet pipe (which for slubbing and pieces is perforated along the bottom of the dye vat), thus equally distributing the strengthened dye liquor from the chamber through the dye vat. The process of extraction takes about twenty minutes, and, when this is complete, a wheelbarrow may be placed under the chamber, the door opened, and the spent logwood easily removed by aid of a light coal-rake. The filtering mattress may be withdrawn, and a clean one substituted, or the same one used again after undergoing a bath from a hose pipe or pail of cold water, which will entirely remove the finely divided particles, which have the appearance of mud. Having replaced the filtering mattress, and refilled the chamber with logwood, the process is repeated. A feature in this machine is that one extractor may be arranged to work two dye vats, the process of dyeing and extracting, therefore, may be carried on continuously, thus ensuring a great saving of time. We may particularly mention the dyeing of slubbing as an instance of the practicability of the machine. In this case, an extractor was fixed to two dye vats, the chamber supplied with logwood, and then set in motion. The liquor was allowed to circulate for ten minutes into dye vat No. 1. The slubbing was then entered, and the extracting continued for fifteen minutes longer. The machine was then stopped, the logwood and filter withdrawn, and fresh supplied, the valves of No. 1 closed, the liquor allowed to run into dye vat No. 2, and the same process was repeated as for dye vat No. 1, thus giving ample time for finishing the double dyeing operation without loss of time, at, the same time, circulating the dye liquor during the dyeing process. The advantages of the machine are briefly enumerated as follows:—It is a perfect extractor of colouring matter from logwood or other dyewoods, as is proved by the testimony of those using it, who find that one ton of logwood used in it is equal to 24 cwts. boiled in the bags, thus saving about 25/- for every ton of logwood used. The machine assists the dyer in estimating the relative values of different deliveries of dyewoods, and also greatly aids in obtaining uniformity of shade. The saving in logwood boiling bags is also a great consideration, as they are entirely dispensed with. The filtering arrangements are not only of the cheapest, but most perfect description, for, whereas, under the old process of boiling in bags, the finer particles of logwood escape into the dye liquor, and then into the yarn, in this arrangement, the whole remains behind to be removed as before described. An important consideration in dyeing is that of keeping the dye liquor, and also the material dyed, free from dust and fine particles of wood, which escape even where double bags are used. Yarn or slubbing, dyed under such conditions, has not only a rough feeling, but, as in the case of yarn passing through knitting machines, this dust and grit falls incessantly into the machine, and, in the case of slubbing, when gilling or re-combing, the inconvenience of this dust is acknowledged by all. The extractor is equally adapted for use by tanners in extracting acids from barks, myrabolams, &c., thus ensuring the use of pure, unadulterated, extracts. The machine is inexpensive, will save its cost in a short time, and works perfectly. Further particulars may be obtained from the patentee, Mr. F. Rhodes, Gomersall, near Leeds, who will be pleased to arrange to show the machine working to those interested, or will forward copies of testimonials on application. The inventor has received a testimonial from Messrs. George Lee and Sons, Limited, Wakefield, who say they have had the extractor working, attached to the top-dyeing machines, and it is giving every satisfaction. It has enabled them to make a considerable saving in logwood, its filtering arrangements being perfect.

## Robey & Co., Globe Works, Lincoln.

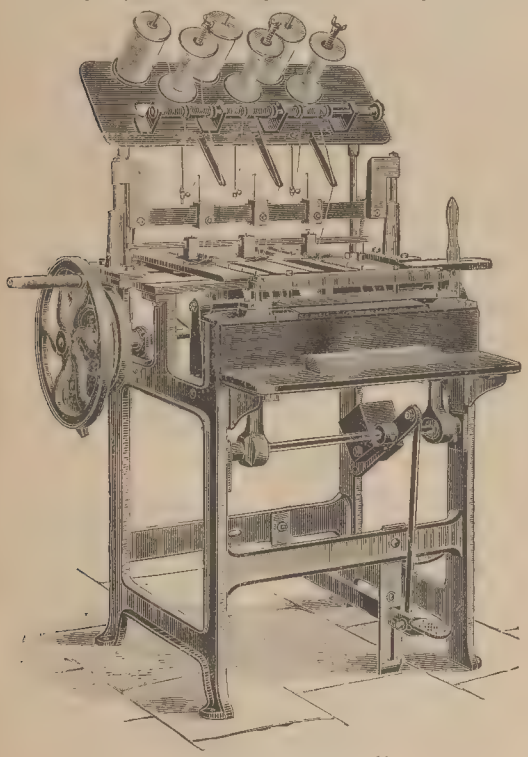
### ROBEY AND CO.'S EXHIBITS AT THE SMITHFIELD SHOW.

These consist of one of their well known Compound Robey Semi-Fixed Engines, which is fitted with their Patent Automatic Governor and Link Expansion Gear, by means of which the utmost economy in steam is produced, with perfect regularity in speed. A series of carefully conducted tests show that the improved compound engines, as made by Robey and Co., will work with a consumption of less than 2 lbs. of Welsh coal per horse power per hour when developing 2½ times their nominal power, an economy far beyond that attained by any other maker. *Horizontal Fixed Engine, Class E type*, fitted with patent trip expansion gear. By the adoption of this patent expansion gear, the following important advantages are secured:—great economy in fuel; perfect regularity in running; absence of friction; and simplicity of construction. *Horizontal Fixed Engine, Class D type*, fitted with patent automatic governor and link expansion gear. This engine will maintain a practically constant speed, with great variation of load. Just the required quantity of steam to do the work is used, and this being admitted at boiler pressure, can be cut off at an early part of the stroke, and do work by its expansion in the cylinder, such being a clear gain. The cylinder is steam jacketted, well drained, and fitted with all necessary cocks. The connecting rods and all bearings are fitted with efficient lubricating apparatus for long runs. *Horizontal Fixed Engine, Medium Stroke.* This engine is also fitted with the class D automatic expansion gear above described. These engines are made self contained, on one massive cast iron foundation, with which are cast the main bearings. The crank shaft is bent out of a solid bar of steel, and is especially strong, so as to resist heavy strains without risk of bending. It can take the fly wheel on either side, though it is best on the side shown, *i.e.*, opposite to the cylinder, as, by this means, the strain and wear are more equally distributed. When required, the fly wheel can be on one side, and a driving pulley on the other. This class of engine is specially useful where space is limited, or where the foundations are not good, as, being self contained, they do not get out of truth with any settlement of foundations. It can also be placed upon an upper floor, and merely requires bolting to the joists. *New Design of Vertical Engine and Boiler combined.* In this engine the main bearings, blocks, and piston guides are cast in one piece with the engine framing, and are tooled by a special machine at one setting, so that all the parts are made perfectly true. All the details are well made and finished as in the more expensive form of engine, and the lubricating arrangements are well attended to. *Vertical Engine, High Speed*, suitable for electric lighting of mills, &c. This engine is designed to work with a high steam pressure, and may be arranged to run at various speeds, as may be found most suitable for the work it has to do. All the wearing parts have very large surfaces, and it is fitted up with means for self lubrication, so that it may be run continuously, without any risk of heated bearings; while every part of it is thoroughly well lubricated, it is so arranged that no oil is wasted. When used for electric lighting, is is mounted on a cast iron base plate, the other end of which carries the dynamo. The base plate is provided with lugs and adjusting screws, so that the driving belt can be tightened without stopping

the machinery. The engine is perfectly balanced so as to run at a high speed without excessive wear, and the whole forms a strong, durable, and compact motor, which can be thoroughly relied upon to work economically and safely during long runs, without giving trouble. *Portable Engine.* This is of Messrs. Robey and Co.'s well known type, fitted with their improved high speed equilibrium governor, steam jacketted cylinder, expansion eccentric, and feed water heater. The firm will give further information on application being made to them at their works in Lincoln.

## Nuttall's Jacquard Card Lacing Machine.

Our attention has been drawn to Nuttall's jacquard card lacing machine, which we have pleasure in illustrating and describing. Many inventions have been brought before manufacturers for the more speedy and the better lacing of cards, and mention has been made of some of these in our Journal. The latest of them is the one under notice, in which there are many important features, and the inventor has just cause to consider his machine all that can be desired. It will lace together any size of jacquard cards, is simple in construction, easy to manage, and is not expensive. It will lace at the rate of 1,000 cards per hour. No shuttles are used and, consequently, there are no spools to fill. The spaces between



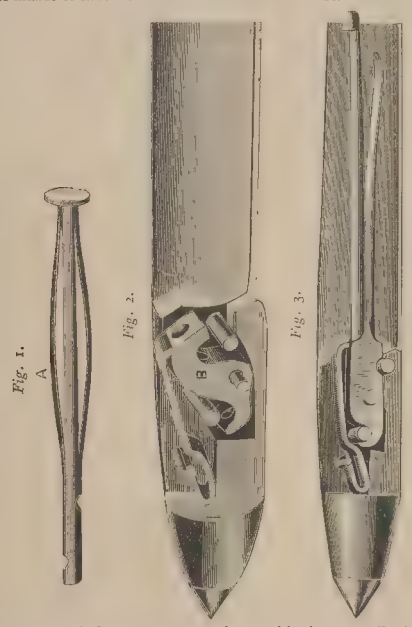
*Nuttall's Jacquard Card Lacing Machine.*

the cards are uniform, and perfect fit on the cylinder is guaranteed. Repairs are easily effected. and new cards readily inserted in a set. A peg-hole cutting arrangement can be fixed to the front of the machine so that the cards can be punched with the peg-holes and laced at one operation. Four cards at once can be placed in advance of the sewing needles. It can be arranged to work in combination with a card repeater, when one attendant is only required to the two machines. All its motions are simple and reliable, and its management is easily acquired. These are a few of the advantages claimed for the machine. The construction may be gathered from the illustration and following description:—The machine consists of two side frames, bound together by a top plate or table, and having a cross-shaft at each end, carrying pulleys divided by driving pegs, upon which endless link chains are placed. The links are so arranged that the length of each two such links is equal to the breadth of one of the cards to be laced, one of each two links being formed with a hole into which the pegs of the chain pulleys can enter, and the other link carrying a peg for feeding the cards into the machine. Upon the table are arranged, on each side, adjustable plates, each having a groove into which one of the link chains is inserted, so that only the pegs on the links project above the surface of the plate. The chains pass through these grooves over, and return under, the table. The cards to be laced may have the pattern and peg holes punched into them, or they may be blank for repeating machines, with only the peg-holes punched into them. The cards are placed with their peg-holes upon the pegs on the link chains, and are carried forward by them as the pulleys on the cross shafts are rotated. One of the cross-shafts receives intermittent motion from the main driving shaft of the machine by means of a single cog wheel, on the main shaft, actuating a star wheel on a stud, the motion of which star wheel is communicated to the cross-shaft through spur gearing, or other means. The other cross-shaft is rotated through the link chains and pegged pulleys from the former. There may be two or more such link chains and pulleys for them, according to the width of the cards to be laced, and the number of peg-holes in the same. The grooved plates and pulleys are arranged so as to be adjustable on the table for different widths of cards. The main shaft carries, at each side, a cam giving a vertical up and down motion to a slide guided in suitable guides. The two slides are attached to a cross-bar called the needle bar, carrying two or more adjustable needle holders, fitted with strong needles and thread guides according to the number of lacings required. Above the needle bar, a creel is arranged for two bobbins for each needle, one of which contains twine, and is provided with suitable arrangements for putting drag upon it and tension on the twine, the other bobbin contains tape. Behind the needles, another cross-bar is supported on studs, or their equivalent, fixed to the table, and carries a presser foot for each needle, for pressing the cards upon the table, provided with a hole for the needle to pass through, and a slot in front for the guidance of the tape. When a second tape is to be used on the underside of the cards, other bobbins are arranged in front of the machine below the table, and carry the tapes from these, through suitable guides, to the top of the table under the pressers. The cards to be laced are carried forward by the link chains under the pressers and top tapes, and over the bottom tapes, when these are used, and are pierced together with the tapes by the needles, which are made like ordinary sewing machine needles, with eyes near the point. Underneath the table there is arranged for each needle a short shaft supported in a bracket bolted to the table or groove plate, and carrying a looping hook at the end, and rotated through gearing from the main shaft of the machine. The hook seizes the loop formed by the needle as it rises, opens it and twists it, and holds it open for the needle to pass through on its next descent, producing a twisted chain stitch, the shape of the hook and method of forming the stitch being similar to those of a Willcox and Gibbs' sewing machine. The feed motion for the cards is so adjusted, with reference to the stroke of the needle, that a descent of the needle takes place between each two successive cards, other stitches being made through the cards. The chain of laced cards passes over the chain pulleys at the back end of the machine, which chain pulleys are formed with flanges to the rim that lift the cards off the pegs on the link chains, and allow them to be deposited upon the floor, in case the machine is used independently. Change pieces may be provided to laced cards of different breadth, and the machine may be arranged for driving by hand or power. Where blank cards are to be used on self-acting repeating machines, the peg-holes are punched by a peg-hole punching machine attached to the front of the lacing machine, and worked by a treadle. The operator sits or stands before the latter machine and places a card upon dies against adjustable stops. He then depresses the treadle, and thereby draws the punches down and punches the peg-holes. He, next, quickly withdraws his foot, when the springs draw the punching rail up, and the weight lifts the treadle lever and causes it to strike against the top of the slot, and thus gives a blow to the punch rail, by means of which the card is stripped off the punches. The attendant then places the card on the link chain of the lacing machine, thus it is not necessary to handle the cards twice, as when punching and lacing machines are separate. Mr. James Nuttall, Heap Bridge, Bury, is the inventor and maker of the machine, from whom further particulars may be had.

## Waddington's Interchangeable and Double Rest Pin Shuttle Tongues.

The improvements made in the construction of shuttles for weaving various classes of textile fabrics have, we should say, been as numerous, during the past few years, as those for any appliance connected with the textile industry. These improvements, many of which have been patented, and are now before users of this particular necessity, have, undoubtedly, in the majority of cases, proved of great utility in the production of fabrics in an effective manner, and at the same time have, in various ways, tended to the weaving of the material more economically. The merits of some of these shuttles have, on several occasions, been brought before the readers of our Journal. The making of a shuttle, having a loose spindle or tongue, of course, is not new, but the one now under notice has features that are worth bringing before those interested in weaving fabrics generally, and, after a perusal of the description below, its merits will be at once recognised. Fig. 1 represents a loose tongue, made in such a manner that it is interchangeable, the fitting parts being machined to *standard* guages. This principle allows of any length, or number, of shuttle tongues being made, suitable for any kind of bobbin or spool and will fit any or all the tongue heads made according to this invention. Fig. 2 shows a section of a shuttle, from which it will be seen that when the tongue is not in the tongue head B, a spring holds it in the position as illustrated, but, immediately the tongue is inserted in the tongue head, it is pressed down, falling into position as in Fig. 3, which shows the ordinary make of shuttle tongue C. It will be noticed that the tongue head works upon a centre pivot, there being two rest pins, one above, and the other below, the tongue head. The loose tongue is so cut that, when inserted into the tongue head and pressed down by the spring, it fits to the two rest pins accurately. This arrangement reduces the possibility of the tongues wearing down to any extent, as an increased surface is provided which prevents this in a great measure. By this invention, the tongues are held so firmly that, during weaving, the vibration is reduced to a minimum, consequently,

the breaking of weft and the making of waste is, in a manner, almost obviated; a decided saving is, therefore, effected. The principle of the mechanism, which was patented some time ago, can be carried out in various makes of shuttles with such benefit to the user that the maker is




sanguine that their first cost can soon be saved in the more effective weaving of goods. Further particulars, prices, samples, &c., can be had of Mr. J. Waddington, Shuttle Maker, Holme Top Mills, Little Horton, Bradford.

## The New Substitute for Silk.

Silk manufacturers have recently had their attention called to a new discovery, which was represented to them as a cheap substitute for silk, and was destined to revolutionize the silk industry. It was the invention of the Count Hilaire de Chardonnet, of Besançon, France, who has prepared a fibre, by a chemical process, from cellulose, out of which fabrics are declared to have been woven that resemble pure silk so closely that a chemical analysis alone would disclose the difference between them. The story of the discovery is that at a meeting of the French Academy of Science in 1884, the ravages of the silk-worm disease was alluded to by the President, Mr. Blanchard, and the suggestion was made that chemistry should attempt the conquest of the disease. Count Chardonnet is a chemist. He conceived the idea of placing the silk industry beyond the hazards of changeable seasons of production by forcing the silkworm out of business. On May 7th, 1889, he announced the success of his work. He said that it became apparent in the early stages of his experiments that, to produce a thread similar in transparency, texture, and brilliancy to the product of the silkworm, it would be necessary to spin it from some liquid solution. Cellulose was chosen as the starting point, the most convenient preparation of which was made from certain parts of the young wood. With this material, a pure octo-nitro-cellulose was made by treatment with nitric acid, and then dissolved in a mixture of thirty-eight parts of ether and forty-two parts of alcohol in a proportion of 6·5 per cent. Such a solution is called collodion. The collodion was placed in a retort in which an air pump kept up a pressure of several atmospheres. The collodion flows off through tubes, at the outer ends of which are glass nozzles with air-like apertures of sizes to suit the desired fineness of the thread. These nozzles are surrounded by cylinders, in which a current of cold water is kept in circulation. As the celluloid flows out of the nozzles in fine fibres, it is congealed by the water. A small automatic machine is employed to lead the fibre off and wind it. The thickness of the thread can be regulated perfectly, and the hanks are made up as in silk. This thread, like all substitution products composed of starch or cellulose in which hydrogen is more or less replaced by nitryl, is termed pyroxlin. It is, under certain conditions, explosive, and could not be considered a practical substitute for silk under such conditions. It is, therefore, treated with a bath of dilute nitric acid, which removes the nitric acid from the fibre, and renders the fibre non-explosive, and not more inflammable than silk. It can now be made up into fabrics and dyed like real silk. Specimens of the fabric made by the original and comparatively crude process were exhibited at the Paris Exposition, and excited great wonder and admiration. Patents were obtained by Count Chardonnet, in France, Germany, England, Italy, Holland, Belgium, Spain, Portugal, and the United States. Manufacturers in all these countries have been investigating the new fibre. About a month ago, the agent of Count Chardonnet appeared in New York with an offer to sell the American patent for $500,000, and, upon invitation of Secretary Richardson, of the Silk Association of America, some half dozen of the most prominent manufacturers attended the meeting at the association rooms, at 70, Grand-street, to investigate the matter. One of these gentlemen was seen by a *New York Times* reporter. He said:—"Such wonderful accounts had come to us about this new discovery, and its destiny to revolutionize our business, that we were, of course, interested in it. There were only two pieces of cloth exhibited, each about the size of a sheet of foolscap, one of which was said to consist of the filling of a new fibre, while the warp was of pure silk. We tested the first piece by all the usual tests employed to identify silk, and we came to the unanimous conclusion that the warp was made of pure silk. It burned like silk, smelled like silk, felt like silk, looked like silk—and it was silk. This, of course, made us suspicious of the other representations, but we thought that, perhaps, a mistake had been made, and that the tags upon the respective pieces of cloth had been misplaced, because we found that the other piece, which was said to be part silk and part cellulose, was, in reality, all cellulose. The differences between the two fabrics were not easy to discover, though, Mr. Richardson took samples of them to have them chemically analyzed. The specific gravity of the artificial fibre was twice that of the silk, and its tensile strength about 33 per cent less, that is, it would take twice the quantity of the artificial fibre, by weight, to produce a given quantity of cloth, that it would of pure silk, and it would not be as strong as silk by about one-third. Neither did the woven fabric possess the elasticity of silk—and, in short, while a good imitation, it was not silk. We offered to pay the expenses of making 1,000 pounds of the fibre in order to practically demonstrate the value of the invention, but the best we could get the agent to agree to was that we might make the experiment upon payment of $10,000 down for the privilege. This, we were, of course, unwilling to do, and there the matter hangs for the present. The agent has returned to France, and is to send out further samples of the new product, and such explanations and further information as his principal may be willing to impart. Upon present information, none of the silk manufacturers feel like putting much money into the affair. It is claimed that the stuff can be made from almost any known material of a fibrous character, and at about $1·40 per pound. This, at its specific gravity, will make its relative cost to silk about $3 a pound. Well, at that price it would, of course, become a substitute for pure silk for a great many uses, even if it would not stand the test of wear for clothing; but even its cost or comparative cheapness remains yet to be demonstrated."—*N. Y. Times*

## Commercial Failures.

According to *Kemp's Mercantile Gazette*, the number of failures in England and Wales gazetted during the five weeks ending Saturday, November 30th, was 419. The number in the corresponding five weeks of last year was 480, showing a decrease of 61, being a net decrease in 1889, to date, of 284. In addition to these gazetted failures, there were 315 Deeds of Arrangement filed at the Bills of Sale Office during the same five weeks. The number filed in the corresponding five weeks of last year was 420, showing a decrease of 105, being a net decrease in 1889, to date of 44. The number of Bills of Sale published in England and Wales for the five weeks ending Saturday, November 30th, was 970. The number in the corresponding five weeks of last year was 1,116, showing a decrease of 146, being a net decrease in 1889, to date, of 1,919. The number published in Ireland for the same five weeks was 37. The number in the corresponding five weeks of last year was 51, showing a decrease of 14, being a net decrease in 1889, to date, of 91.

## Book Notice.

Sizing and Mildew in Cotton Goods: By G. F. Davis and C. Dreyfus, Ph. D. Manchester: Palmer and Sloane, Princess Street. London: Simpkinson, Marshall and Co.

The above work is a second edition of the book published ten years ago. The writers explain that, in the various chapters into which the work is divided, they have endeavoured to systematise facts in order to aid those manufacturers who may wish to investigate the subject. The result is a readable volume of most useful information, treating upon cotton and cotton spinning, sizing and weaving, size and its components, the moral aspects of sizing, filling bleached and unbleached goods, packing and packing materials, the composition of cotton goods, the fermentation of organic substances, fungi, mildews, and discolourations, antiseptics and the prevention of mildew, microscopical examination of cloth, and a table of aqueous vapour. The book is well illustrated. Its chapters are treated in a masterly style, and, altogether, it is a book which is well worthy the attention of manufacturers, technical students, and others interested in the manipulation of cotton.

## Personal and Trade Notes.

Dame Mills, Oldham, which have been closed for some years, are to be opened again.

Mr. Sheard, manufacturer, has been elected a member of the town Council of Batley.

Mr. James Holroyd, of the firm of Holroyd and Bailey, shawl manufacturers, Grove Mill, Diggle, Saddleworth, died on November 28th.

Mr. John Lund, manufacturer, Manningham, one of the best known frequenters of the Bradford market, died on Sunday, Nov. 24th, at Blackpool.

The Commercial Mill, Slaithwaite, Huddersfield, was sold by auction on November 26th to a Golcar firm of woollen manufacturers, for £7,025.

The death is announced of Mr. R. Allen, of the firm of J. and R. Allen, manufacturers, Egerton Street, Radcliffe, Lancashire, which occurred on November 21st.

Messrs. C. Robinson and Co., manufacturers, Batley, have taken Little Dock Ing Mills, in which they are having placed new looms and spinning machinery.

Messrs. Buckley, cotton manufacturers, Mossley, have had a fire which has done damage to the amount of £10,000, throwing about 150 hands out of work.

Mr. Alfred Illingworth, M.P., and Mr. Briggs Priestley, M.P., have gone for a tour to Egypt. Both gentlemen are engaged in the textile trade of Bradford.

Messrs. Colbeck Brothers, Alverthorpe, near Wakefield, have turned their business into a Limited Company, the capital required being subscribed nearly twice over.

Messrs. Webster Brothers, mungo manufacturers, of Silver Royd Hill, Wortley, Leeds, have rented a large place at Upper Armley, and will carry on their business at both mills.

Much speculation is being exhibited by the American carpet manufacturers as to the precise spot which will be decided upon by Messrs. Hughes, of Kidderminster, for the Canadian carpet factory.

Messrs. Jackson and Steeple have purchased the Crookbottom Manufacturing Company's shed for £14,400, or £11 16s. per loom. The plant was estimated by the company to be worth about £40,000.

Mr. George Kerr, teacher of silk throwing at Macclesfield Technical School, has been appointed manager of the silk department of Messrs. Robert Whytlawe and Co., Grove Park Mills, Glasgow.

Mr. A. R. Sadler has been appointed, *pro tem*, teacher of silk throwing at the Macclesfield Technical School, in place of Mr. Kerr. Mr. Sadler holds a certificate from the City and Guilds of London Institute.

The proposal to form a carpet syndicate amongst English manufacturers has been kept very quiet. That such a project is "on the carpet" appears to be all that is known outside the ring.

The extent of Messrs. Lister and Co.'s mills at Bradford is very large, and is still increasing, as additions are to be made to the buildings immediately.

A Company is being formed to take over Summervale Mills, Oldham, which were worked by the late Mr. W. Chadwick. The Directors of the new Company are mostly connected with other textile mills.

Mr. Wilkinson, Valley Mills, Bradford, has removed his weaving machinery to premises at Colne. The rooms he occupied at Valley Mills have been taken by Messrs. J. L. Stewart and Co., who have, for a long time, occupied other premises at the same address.

Mr. John Ambler, spinner, Atlas Mills, Bradford, died suddenly on the 26th ultimo, at his residence at Burley-in-Wharfedale. Mr. Ambler was well known, being a member of the Council of the Chamber of Commerce and of the Finance Committee of the Technical College, Bradford.

Messrs. Booth and Bairstow, Bradford, have taken a factory at Baildon, which gives great satisfaction to the residents of that place, who, till now, have had long distances to walk to the nearest mills. By the opening of this, many operatives will be enabled to get work at home.

The Economic and Smokeless Steam Firing Patents, Limited, has just been formed, with Sir James Farmer, machine maker, Salford, Manchester, and Mr. John S. Grimshaw, cotton spinner, Huncoat, Accrington, as directors The capital has been more than subscribed.

The next firm to come under the Limited Liability Act is that of A. and S. Henry and Co., Bradford, Manchester, &c. The share capital is £1,100,000 in £10 shares, which will be mainly taken by customers, employés, &c.

The Directors of the firm of A and S. Henry and Co. are Mr. Mitchell Henry, London, Chairman, Sir Henry Mitchell, Bradford, and Messrs. C. J. Wilson and F. H. V. Henry, Bradford, G. Ollier, Manchester, J. Laycock, Worsley, and W. Russell, Belfast. Out of the nine Directors, eight were partners of the old firm, and the ninth actively engaged in the business of the firm. The payment of the Directors is set down at £11,000 per year.

Sir Henry Mitchell has presented each of the employés at the Bradford branch of the firm, who have been with them twelve months, with a fully paid up share in the Company.

The technical classes in Halifax are being extended. The Cloth-workers are giving £100 on condition of £400 being raised locally. They also offer £1,000 towards a building fund. Looms have been presented by Messrs. Hutchinson, Hollingworth and Co., Limited, Dobcross, Saddleworth, and other makers.

The textile men of Halifax are responding to the call of the Cloth-workers' Company for the £400. Messrs. J. Crossley and Sons, Limited, give £100, J. and J. Baldwin, £50, L. Clayton, £50, F. Smith and Co., £20, F. H. Bowman, £10, &c

## Tariff Changes.

Switzerland.—Blankets made of cotton waste. Categories 288 and 288*a*. Duties, 4 francs and 35 francs per quintal respectively. Pads of stuff for the caulking of ships, impregnated or not. Duty, 3 francs per quintal. Stuff of wool, common, for blankets, in the piece; unbleached, or also with coloured stripes. Duty, 12 francs per quintal.

Mexico.—Machinery for manufacturing, agriculture, arts, trades and mining. Duty, free.

## Textiles in Spain.

An occasional correspondent from Spain writes, respecting the development of textile industries in that country, that for some time much animation has been noticed in the industrial establishments in Catalonia, especially in those places where manufacturers work for export. This embraces divers articles, little or not at all exported formerly. Also wool stuff manufacturers of Sabadice have received fairly good orders from La Plata, in fact, in some isolated cases, some very important transactions have taken place for the season. It appears that the Peruvian Government have given an order for 40,000 metres of military cloth to the manufacturers in Tarasa. Cotton textile manufacturers are also selling well for export. Cotton tricot makers, for instance, produce at such low prices that they beat all competition, and forward a large number of articles to France and England.

## Yarn Softener.

An inquirer in the *Centralblatt fur die Textil-Industrie* desires to be informed what proportions of olive oil and sulphuric acid he must use to obtain a saponaceous composition for softening yarn. C. F. says that, for castor oil, the proportion to sulphuric acid is 25 to 6. For olive oil, if the interrogator is determined to use it, the proportion would be about the same, or, at most, would differ but slightly. The true proportions would have to be ascertained by experiments, using a definite quantity of oil with varying quantities of acid. By following the above proportion, he would have no trouble. The process, which consists of the displacement of the fatty acids of the oil by the sulphuric acid, is erroneously called "saponofication." This takes place by the use of alkalies, such as soda, potash, ammonia, etc., but not by that of acids. Great caution must be observed in the mixing of oil and acids, and it must be done very gradually.

## How to Dye Brown on Plush.

The following recipe for the dyeing of brown on plush is given by a correspondent of the *Centralblatt fur die Textil-Industrie*:—Enter the plush, after having moistened it well, in a solution of permanganate of potash, and handle in it until a brown colour is produced. The depth of the brown to be obtained is a result of experience. This bath, after it has become old, may be thrown away, but can be used for many lots, of course, always adding more permanganate. It is difficult to specify the quantity to be added. The stronger the bath, the quicker the dyeing process, although the greater also is the loss by its decomposition, which is likely to occur during the time it stands unused. The decomposition is generally caused by the influence of light, or organic substances, with which the potash solution comes in contact. It is best, therefore, to place the dye vat in the shade, and cover it well. Nor must the vat be of wood, which would soon destroy the bath. A dry kettle of copper is best. The action of permanganate of potash is well known to dyers. Upon it is based a bleaching process, in which the fabric is first located with this reagent, which colours it dark, In the subsequent treatment with saccharic acid, the fabric becomes white. The points of the dyed plush are bleached in an analogous manner, modifying the process by using, in place of the saccharic acid, chlorine water, to which a small quantity (about 5 per cent of the goods) of hydrochloric acid is added. It is well, perhaps, to thicken this fluid with dextrine or starch (about 2 per cent. previously made into paste). The plush is spread out, and its points are rubbed with a brush dipped into the caustic fluid, until they have turned white. The addition of dextrine prevents the chloride water from spreading over the other portions of the plush. This addition is to be made when white designs, made by rubbing through a stencil plate, are to be produced. After having rinsed well, enter into a dye bath containing about 10 per cent. (of the goods) of aniline salt and 8 per cent. of hydrochloric acid. Run in this bath for one hour, by which the brown of this plush is completed. Then draw through a light ammonia bath, so as to dull the acid, and to avoid rinsing too frequently. Rinse and dry

According to a correspondent of the *Russian News*, the quantity of Asiatic cotton exported from Azun-Ada, on the Caspian, for the use of Russian cotton manufactories, between the 1st January and the 1st September of the present year, amounted to 18,437 tons. It is expected that during the remaining four months of the current year, 8,000 tons more will be transported across the Caspian, so that Russian cotton factories will receive in all about 26,400 tons of cotton grown there.

# PATENTS.

## Applications for Letters Patent.

Bleaching yarns. P. Thomas, London. 22nd Nov. 18,718
Bleaching and washing woven fabrics. P. Thomas, London. 22nd Nov. 18,719
Carding or combing machines. A. J. Boult, London. 29th Oct. 17,122
Combs and reeds for warping, &c. A. P. Bird, Glasgow. 6th Nov. 17,674
Circles of combing machines. J. Knowles, J. Halstead and M. Firth, Bradford. 7th Nov. 17,727
Carpets and looms. J. Hunter, Glasgow. 8th Nov. 17,892
Cop or bobbin tubes. J. E. P. Scott, Manchester. 12th Nov. 18,002
Carding engines, scutchers and openers. R. Lord and G. Fletcher, London. 15th Nov. 18,240
Carding engines. T. and J. W. Rothwell, London. 15th Nov. 18,327
Cards (top stripping winder for revolving flat). C. A. Mason, London. 19th Nov. 18,497
Carding engines. G. Paley, London. 20th Nov. 18,576
Carding engine stop motion. J. Boon, Manchester. 21st Nov. 18,624
Caps for ends of loom lathes. J. Jucker, Manchester. 21st Nov. 18,630
Dividing and condensing rovings of fibres. E. Priest, Halifax. 29th Oct. 17,059
Dressing frames. J. and W. Witham, Burnley. 4th Nov. 17,451
Drying Warps. W. Lodge, Halifax. 7th Nov. 17,736
Dyeing, bleaching, &c., fibres. A. Graemiger, London. 13th Nov. 18,115
Drying wool, &c. W. and H. Broadbent, Halifax. 16th Nov. 18,310
Dividing and folding sliver on condensing machines. J. and H. Stanhope, London. 19th Nov. 18,464
Drying wool and waste. P. Cantillon and L. Hubert, London. 20th Nov. 18,566
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Economising fuel and consuming smoke. C. G. S. Hills and G. Paine, Rochester. 21st Nov. 18,627
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Frame for pile fabrics. T. R. Kay and R. C. Young, Bradford. 30th Oct. 17,157
Feeding wire to card setting or saw tooth punching machines. E. and D. Sykes and W. H. Kellett, Huddersfield. 8th Nov. 17,786
Folding and measuring fabrics. J. Cooper, London. 8th Nov. 17,874
Felts. F. A. Oetzmann. 5th Nov. 17,603
Flyers for certain spindles. J. V. Eves, Manchester. 14th Nov. 18,221
Fasteners and flats for securing card clothing. M. H. Smith, Halifax. 15th Nov. 18,249
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Flax yarns (treating). T. Burrows, London. 23rd Nov. 18,852
Flax and hemp (preparing). T. Burrows, London. 23rd Nov. 18,853
Guiding and supporting circles of combing machines. F. Ambler and J. Hayton, Bradford. 30th Oct. 17,145
Heald operating mechanism. R. L. Hattersley and J. Hill, Keighley. 1st Nov. 17,325
Harness cords of looms. G. Wright, Bradford. 5th Nov. 17,541
Healds and harness of looms. G. Wright, Bradford. 5th Nov. 17,542
Handkerchief. G. McLeish and Co. and W. F. Browne, Belfast. 6th Nov. 17,649
Healds (attaching) to dobbies. W. G. Thomson, London. 8th Nov. 17,876
Indicating and measuring cloth, &c. B. A. Bates and J. Wood, Huddersfield. 28th Oct. 16,974
Knitting machines. S. W. Eden and H. W. Scothon, Nottingham. 29th Oct. 17,051
Knitting machines. J. D. Harris and A. W. C. Shuttlewood, London. 5th Nov. 17,584
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Knitting machine transfer comb. W. Harrison, Manchester. 6th Nov. 17,678
Knitted articles and machinery. S. Davis, F. Moore, J. I. Coltman and J. Shelton, London. 8th Nov. 17,845
Knitting machines. T. J. and J. W. Kiddier, London. 8th Nov. 17,901
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Leashes of loom harness (machines for). E. Lebegue, London. 15th Nov. 18,305
Looms. F. C. Wheelwright and T. R. Whitehead, Bradford. 16th Nov. 18,312
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Mails and healds (wire). J. A. Greenwood, Bradford. 5th Nov. 17,543
Measuring wool for mat, &c., making. T. R. Dix, Acton. 21st Nov. 18,606
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Plush (woollen). H. Mullers and A. Spindler, Manchester. 2nd Nov. 17,397
Preparation of textile and filamentous materials. S. Pegler, London. 8th Nov. 17,882
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Pirn or cop winding. J. and T. Boyd, Glasgow. 8th Nov. 17,864
Printing textile fabrics. J. Archer, Manchester. 13th Nov. 18,145
Pirns used in linen spinning. J. V. Eves, Manchester. 18th Nov. 18,392
Pirns or cops of yarn. J. V. Eves, Manchester. 18th Nov. 18,394
Pressing and finishing textiles. J. Miller, London. 23rd Nov. 18,790
Quilts (figured), &c. C. Brazil and J. E. Johnson-Ferguson, Manchester. 8th Nov. 17,808
Reeling frames, &c. T. and J. Smith and W. Fairclough, Manchester. 22nd Nov. 18,704
Ribbon and apparatus. M. Heimann, London. 22nd Nov. 18,748
Ribbed fabrics (welts on). C. R. Woodward, W. Cavers and R. A. Hickling, London. 23rd Nov. 18,840
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Spinning and doubling. H. Gay, Manchester. 4th Nov. 17,455
Spinning and flyers. H. D. McMaster, London. 8th Nov. 17,818
Spinning, winding and doubling hemp, &c. F. W. Rawstron, Halifax. 8th Nov. 17,866
Sizing machines (dashers and rollers). C. W. Lancaster, Halifax. 8th Nov. 17,869
Silk dressing. G. F. Priestley, Halifax. 6th Nov. 17,664
Shuttle check. R. Hartley, London. 11th Nov. 17,927
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Separation of an extract from waste waters of wool-washing, &c. C. Lahnsen and C. Feuerlein, Bremen. 21st Nov. 18,642
Spinning. A. Wilson, Belfast. 22nd Nov. 18,769
Spinning over cord, &c. F. W. Lenk, London. 22nd Nov. 18,818
Tubular cardigan web on Griswold, &c., machines. H. Igel and J. Luddington, Newcastle-on-Tyne. 1st Nov. 17,301
Treating, scouring and washing wool, &c. I. and J. Smith, Halifax. 14th Nov. 18,180
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Twisting and doubling. J. Farrar, Halifax. 21st Nov. 18,763
Weft supplying and shuttle mechanism of looms. W. Mac Ilwraith, Glasgow. 31st Oct. 17,281
Woollen yarn. Messrs. Evans, Stroud. 4th Nov. 17,449
Winding Warps. J. H. Stott, Manchester. 6th Nov. 17,683
Winding or reeling yarns. J. H. Stott, Manchester. 6th Nov. 17,684
Weaving wide fabrics. A. D. Emery, London. 12th Nov. 18,033
Weaving wide fabrics. A. D. Emery, London. 12th Nov. 18,034
Waterproof garments. C. W. Tetley and P. Wienes, Manchester. 13th Nov. 18,085
Winder or reel. B. W. Hornblower, Birmingham. 21st Oov. 18,605

## Patents Sealed.

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|---|---|---|---|---|---|---|---|
| 13,902 | 13,903 | 14,125 | 14,909 | 14,930 | 14,961 | 15,080 | 15,121 |
| 15,258 | 15,260 | 11,326 | 13,106 | 14,000 | 14,507 | 15,214 | 15,402 |
| 15,674 | 2,679 | 7,957 | 8,481 | 12,090 | 12,876 | 13,649 | 13,863 |
| 13,941 | 14,219 | 15,119 | 15,638 | 15,968 | 16,009 | 16,058 | 16,101 |
| 3,705 | 9,637 | 10,737 | 12,291 | 12,328 | 12,329 | 12,367 | 12,429 |
| 13,236 | 14,363 | 14,779 | 15,103 | 15,259 | 15,345 | 15,556 | 15,624 |
| 16,175 | 16,233 | 16,241 | 16,325 | 16,342 | 16,393 | 16,423 | 16,833 |
| 16,921 | 18,737 | 18,947 | 1,080 | 2,733 | 7.044 | 9,470 | 9,677 |
| 10,662 | 10,908 | 12,254 | 12,431 | | | | |

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